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ANIMATE Project

The WELL-TIMED Study

WEST EUROPEAN LOCAL LEGAL ARRANGEMENTS FOR TRANSPORT INFORMATION MANAGEMENT AND EXCHANGE OF DATA

A report prepared for the European Commission High Level Group on Road Transport Telematics

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The WELL-TIMED Study

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1. National Context for RTT

The French state general policy for RTT is today directed by the transport department (Direction de la securite et de la circulation routière) helped by INRETS.

Its main partners are cities, Departments and highways companies. Traffic regulation is solely in the hands of the local state authorities (Prefet) and the city Mayors especially in urban areas. Municipal public transport operators (collective transport) are associated with the information policy.

All traffic policies are implemented in practice by the police and Gendarmerie. They also contribute to information policy through the CNIRand CRICR national and regional bodies, with Equipment services. With regard to regional or national travel information centres, the French government has decided on the conurbation or corridor level. Only the "CNIR" (National Centre of Road Information) operates nationally (composed of three administrations: police, gendarmerie, transports) but distribution of information is free.

Automobile clubs are not involved in the provision of traffic or information services.

For over twenty years, broadcasters have had a major role in the dissemination of data issues from CNIR and CRICR and have also gathered data directly (plane etc.). More recently RDS has expanded their functionality, for example, Europe 1 is the leader of SKIPPER. (see case study below).

The policy framework for advanced traffic information services presuppose arrangements for contracts or partnerships between the public and private sectors. However, systems that do not require public data do not need any kind of permission. No structure of partnership with the private sector exists at the national level

In fact, the state and public local authorities control the data collection process by means of exclusive control of the roadside equipment. They carry out data collection either directly or by means of a franchise or delegation to the private sector from the public service. In the latter case, the agent must let the owner benefit from collecting the data and may not retain intellectual property but may give it to any operator in the same condition. So a private firm will have to facilitate this activity in order to protect the required equality of access.

The state has decided to make the entry of private providers easier in areas where an integrated traffic system provider is created by public authorities, that is to say big cities and main corridors. Powers have already been given to "Region ile de France".

The state has the intention to harmonise arrangements for traffic management operations with traffic information in the eight bigger conurbations. This will help local authorities.

The following cities will be implemented during the XIth Plan: Lyon, Marseilles Lille, Bordeaux, Toulouse, Nantes, Nancy-Metz as well as the axis : Lille-Paris- Lyon-Marseilles-Italy and Paris- Bordeaux-Spain.

2. Case Studies

See reports on Infobus, Mediamobile and Skipper, Sections 5 to 7 of this National report.

3. Discussion

In each example it has been necessary to create a unique public data provider, either physically or conceptually. Each owner must produce the information according to compatible standards and make agreements between themselves and the private operators of similar contracts. They have to be harmonised on the technical, legal and technological levels.

Local authorities and the state may associate to create for a precisely-defined area territory a provider now called "Agence de presse" whose responsibility it is to furnish data in a form that they can be used by service operators. One such "Agence de presse" is nearly in operation in Paris and suburbs, and another is in progress in Lyon. The first one is operated by the public sector. In Lyon it might be given by delegation to a private consortium.

In practice (and this may be a necessary requirement) private sector organisations cannot collect their own data via monitoring equipment along the roads. In principle it is possible to allow at a private body to do so but only by the means of a "concession".

Details of the contractual arrangements are described in Appendix (Contracts)

4. Conclusions and Recommendations

In order to exploit and to disseminate the information there are no special requirements if the service operator has access to its own independent data. If the service operator requires public data, it must have a contract with the public bodies (details in the Appendix to this National report.)

In order to respect the directive of March 1996, a decree is being enacted; it will define more closely and firmly payment conditions for public data. Today, payment is made on basis of a marginal cost and a light " Droit d'auteur".

The major obstacle to overcome in France is the municipal system in which an urban conurbation is composed of numerous municipalities. Currently Paris and its suburbs are the only example of co-operation.

5. Case Study: INFOBUS

5.1. History

Infobus is a dedicated public transport project. Many such projects were envisaged. Jean-Claude Decaux company, one of the world's largest suppliers of "Mobilier Urbain" is trying his system with CGEA, a private bus company. The first campaign to validate liability was in March 1997. The second will be in March 1998.

5.2. - Goals

- for J C Decaux it is to complete services given by its "Abribus"
- for CGEA give a better service to its users in order to increase their number

5.3. - Technical description

Infobus is a paging system which indicates in real time the time of the next five buses and may be on three lines. This information is also available on a screen implanted in the "Abribus". The pocket pager can also receive all messages issued from a mobile system to the standard Ermes.

Buses give their position to the Central Infobus which process the data and transmit to the pagers and the screens by a broadcast operator.

5.4. - Non technical description

For JC Decaux it is a means of marketing the materials and services..

For the bus company it is a marketing tool to persuade users of private cars to use the bus instead.

5.5. - Cost

The trials in Chatou (to the west of Paris) cost FF. 586,000 in 1997 and 100,000 in 1998 for CGEA.

6. Case Study: MEDIAMOBILE

6.1. - History

MEDIAMOBILE originated from the Carminat Consortium which was an association of an automotive company: Renault, autility company : la Lyonnaise des eaux, Sagem and Television de France : owner of the French technical broadcast network, a company of France-Telecom group.

After a long study period and changes amongst the associates, the system was demonstrated in 1996. As the system needs public data, negotiations with city of Paris and state services where held for a period of two years. They were completed in July 1997. Commercial service in the "Region Ile de France" began on 4th of October 1997.

Mediamobile hope to equip other regions but nothing is ready.

6.2. - Goals

To develop a fully commercial, profitable real time traffic information system as in trip planning on board the vehicle. Initially this system is limited to the city of Paris and suburbs (Region Ile de France) but the goal is to equip other big cities.

The service will be augmented by additional information services other than traffic information.

6.3. Technical description

Mediamobile uses a mobile graphical display called "Visionaute". It can be utilised at home or in the car. It combines numeric mapping and RDS-TMC. Data are supplied by public infrastructures owners according to a contract (1a in Jeep) and also by an agreement with a taxi company (G7:2200 taxis)

The system delivers in real time the best itinerary and journey time between two points with options for the driver to specify a fixed point on the itinerary. .

An arrangement with Renault will complete the system by GPS device in order to offer it as an option for the Megane Scenic.

6.4. Non technical description

Mediamobile is a company whose main associates are France Telecom and Renault.

The Visionaute unit costs FF. 2900 and is available through Renault, Point Telecom and FNAC stores. Monthly rental is FF. 120. They foresee 10000 subscribers at the end of 1997 and 200,000 in five years.

6.5. Lessons learned

6.5.1. Cost Acceptance And BudgetaryConstraints

Commercial operations started too recently to have gained a firm view , but the intention of the powerful owners of Mediamobile is to be profitable.

The annual amount to pay to state services and city of Paris is a fix sum of FF. 400,000 and a variable sum .

6.5.2. Technical Matters

Use of RDS TMC and soon GPS are not a problem for a subsidiary company of France Telecom and TDF. The service can easily grow.

6.5.3. Legislation

An ATT service in France is currently only subject to the general law regarding broadcasting, telecommunications, privacy, respect of public infrastructure. However, Mediamobile has secured contracts with public authorities to use public data.. Those contracts describe the area and dedicated network, requirements on quality on information, and charges for the supply of public data .

6.5.4. People

The Directeur General of Mediamobile is a high level manager of TDF

6.5.5. Organisational And Institutional Matters

It is the emergence of Mediamobile that obliged the state and city authorities to organise themselves as harmonised data providers and to adopt a common policy for the commercialisation of public data .

Public authorities request to receive free of charge data in return, for example the data from taxis, so as to assume their responsibilities for traffic management.

6.6. Summary information for MEDIAMOBILE service

MEDIAMOBILE service: page 1	Main players in the information chain, and the principal contractual arrangements in place
1. Geographical region covered by the service	Region Ile de France (PARIS and suburbs)
2. Relevant authorities	- State represented by SIER (Interdepartmental Service Traffic Management) - City of PARIS
3 Infrastructure Owners	- State - City of PARIS
4. Public sector data owners and providers	- SIER - City of PARIS
5. Private sector data owners and providers	Taxis Bleus
6. Service operator	MEDIAMOBILE consortium
7. Information editor and service database managers	- SIER - "Direction de la voirie" of PARIS
8. Communications providers	T D F (France Telecom group)
9. Service provider to the end users (marketing, billing, etc.)	MEDIAMOBILE
10. End users: main groups / categories	In car users: profile not yet determined

MEDIAMOBILE.. service: page 2	Service Delivery Details
11. Description of service content	Digital mapping, RDS TMC, and for the higher equipment GSM. Pre-trip home/office and on-trip in-car VISIONAUTE users
12. Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	Real time and predictive (choice of itinerary and time to cover it) Main streets of PARIS and non-tolled highways of Ile de France Region.
13. Transmission media used	FM radio sub carriers
14. Market segments targeted	20% of in car users
15. Service pricing structure	Price of VISIONAUTE : FF 2900 Subscription : FF 120 by month
16. Strategic marketing partnerships	Renault T D F
17. Nature of any Public / Private partnership	Contracts between MEDIAMOBILE , State and City
18. Main revenue streams	Foresee 10,000 subscribers in 1997, 200,000 in five years

7. Case Study: SKIPPER

7.1. History

Skipper is the idea of a private broadcast operator (Europe 1) which has traditional experience of traffic information (e.g. by plane during week-ends or holidays etc.) The SKIPPER service has been available since January 1996, developed by Europe Grolier, a subsidiary of Europe Communication and Grolier Interactive and Telfi Interactif. (Lagardere Group)

7.2. Goals

The Lagardere Group launched SKIPPER with the aim of conquering markets abroad and exploiting new communications opportunities offered jointly by multimedia and digital broadcasting. It will be complimentary to the existing traffic information given on Europe1, Europe 2, and RFM.

The Lagardare Group is preparing a partnership with RTBF in Brussels, with taxis in the city of Milan and with the police of Shangaï.

7.3. Technical description

Skipper is a sun blind equipped with a radio receiver and a microcomputer which shows a luminescent schematic map of the state of traffic flow in Paris and its suburbs.

Traffic data is obtained by a fleet of more 2000 taxis (Taxis Bleus and Alpha taxis). By GPS each taxi automatically gives his position. After a first check of information, the system, automated by Europe Grolier, correlates GPS positions of the taxis and the section of the roads traversed, using a correspondence table.

The traffic data are transmitted by RDS every minute to the Skipper unit whichwho uses a sub-channel of Europe 1, Europe 2 and RFM . It is a purely factual system without any interpretation.

7.4. Non technical description

Skipper is a department of Europe Grolier with all the possibilities of the Lagardere Group. Almost 4000 units have been sold and the target is 10000 by the end of 1997. Skipper is in negotiation with Renault Toyota and Ford, to equip new models .

Unit cost is FF. 2900 but with no charge for subscription thereafter.

7.5. Lessons learned

7.5.1. cost acceptance

This project seems, to the Lagardere Group, more a case of having the better know-how than a profitable operation. It is also a means of promotion for Europe 1.

7.5.2. technical matters

All the members of this consortium are specialists in their technical field.

7.5.3. legislation

Data utilised by Skipper are currently private. It is therefore subject only to the current legislation on broadcast, telecom or privacy.

If, as is possible, they wish to obtain public data, they must conclude public right contracts with services of the states or local government owners of roads.

8. Appendix 1: Inter-Agency Agreement

PROTOCOLE D'ACCORD SUR L'INFORMATION ROUTIERE EN ILE-DE-FRANCE

AGREEMENT ON ROAD INFORMATION IN THE ILE DE FRANCE REGION BETWEEN THE STATE AND THE CITY OF PARIS

The State and the City of Paris collects road traffic data and operates as a wholesale server of traffic data. They are able to supply private operators with the information they need to run a commercial service of road traffic information.

This agreement is concluded in order to define the terms under which the city and statewould exchange road traffic data and the terms they undertake to observe regarding broadcast to private operators.

The road network covered by the agreement is defined.

A set of general principles is included in the agreement :

- Each public authority retains control and liability for the data entered in its wholesale server. It also retains liability and ownership regarding the processes used to reconstruct traffic situation and travel time in the area under its management.
- It may forward information collected by another public authority with its prior authorisation but only if the recipient has contracted with each authority and observes the Specifications hereafter appended.Any broadcast of road information shall observe the travel policy and strategy on road network management and safety as defined by the relevant authorities.
- The parties to this agreement shall not grant any exclusive right to a service operator regarding the broadcast of road information.

The modes of information supply to service operators are defined under four headings.

1/ Functional scheme

The functional scheme organises the collection and treatment of data by public authorities, and the elaboration and broadcast of road traffic information by the commercial service operators.

2/ Functional provisions

The State and the City of Paris agree to harmonise the modes of supply of the elementary data.

Two committees are created : the Public Authorities Co-ordination Committee (CCCP) and the Consultative Committee on Road Information Broadcast (CCDIR).

The CCCP co-ordinates the work of the public authorities managing a wholesale server providing a network service which are likely to contract with service operators. Its role is also to harmonise the work of the parties to this agreement, to ensure the bringing into play of the users services of road traffic information and to supervise their impact on road safety and traffic. It can also issue an opinion on the conformity of the road information services to the strategy on road network management and safety as previously defined by the relevant authorities. It includes representatives of the various authorities concerned with the issue. It will associate every public information producer of the region who becomes part of the agreement.

The CCDIR comprehends the members of the CCCP supplemented with representatives of the private operators as well as public authorities not yet represented. Its function is to consult the clients of the public authorities on the quality of the information supplied.

3/ Contractual relations with the service operators

Each public authority is autonomous in its contractual relations with the service operators including in the determination of its tariffs and policies. However, it is requested to insert the Specifications hereafter appended in any agreement.

4/ Technical provisions

The wholesale servers are connected to the same network. To exchange information, they will use the Traffic Data Exchange System (SEDT) protocol in a version compatible with the DATEX protocol. Traffic data will be formatted accordingly with CITIES. The public authorities will publish a table locating the network covered by this agreement.

The CCCP is also able to grant a label to the service operators which provide a fast information of good quality while observing the Specifications appended and contributing to the improvement of road safety.

The agreement is concluded for five years and can be terminated under specified conditions.

9. Appendix 2 Contract for supply of Road Traffic Information

CONTRAT POUR LA FOURNITURE DE PRODUITS INFORMATIONNELS RELATIFS AU TRAFIC ROUTIER A PARIS (/PAR L'ETAT EN ILE-DE-FRANCE)

CONTRACT ON THE SUPPLY OF ROAD TRAFFIC INFORMATION IN PARIS (/BY THE STATE IN THE ILE-DE-FRANCE REGION)

This contract is concluded between a service operator and a public authority to determine the terms and conditions of the supply of road traffic information.

The term is three years and can be extended.

The contract is concluded "intuitu personae" which means that service operators cannot transfer the rights they were granted and that any change in the control of the company must seek approval from the public authority.

Six appendices are incorporated by reference.

A royalty must be paid. It is to be reviewed periodically but the service operator may terminate the contract in case of disagreement on the amount.

Notwithstanding that the broadcast of road traffic information is allowed only to the final users of the service, permission to broadcast to secondary operators may be granted, in which case a contract should be concluded between the three parties.

All connection and operation costs are borne by the service operator including when the public authority modifies the server.

The service operator guarantees the public authority against any condemnation of the public authority for facts arising out of their commercial activities.

If the public authority fails to fulfil its obligation to supply information, the royalty payable by the service operator may be reduced. In any events, the public authority is only liable for facts attributable solely to it wrongs and for amounts not exceeding the total yearly royalty payable.

If the service operator does not fulfil a contractual obligation, the public authority may levy a penalty, suspend the contract or terminate it.

If the public authority does not fulfil a contractual obligation, the service operator may seek a court order to terminate the contract.

All disputes arising out of the contract will be brought before the Administrative Tribunal (Tribunal Administratif).

10. Appendix 3 Contract for Broadcast of Road Traffic Information

CONTRAT POUR LA REDIFFUSION DE PRODUITS INFORMATIONNELS RELATIFS AU TRAFIC ROUTIER A PARIS

CONTRACT ON THE BROADCAST OF ROAD TRAFFIC INFORMATION TO A SECONDARY SERVICE OPERATOR (IN PARIS)

This contract is concluded between a secondary service operator, the "original" operator and the public authority. A contract already exists between the two latter parties. The "original" service operator wishes to supply a secondary operator with road traffic information. A contract must be concluded with the public authority in order to allow an agreement between the private persons.

This contract is nearly identical to the contract concluded between the original operator and the public authority (see the "contrat pour la fourniture de produits informationnels relatifs au trafic routier"). The differences lie mainly in two sets of rules concerning the liability of the original operator in that particular capacity and in the financial conditions applicable to the secondary operator (he does not need to pay the fixed part of the royalty).

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ANNEXE 1 : NATURE DES INFORMATIONS FOURNIES PAR LE SERVEUR GROSSISTE DE LA VILLE DE PARIS. ZONE DE COUVERTURE

ANNEX 1 : NATURE OF THE INFORMATION SUPPLIED BY THE WHOLESALE SERVER OF THE CITY OF PARIS. AREA COVERED

This appendix deals with the information supplied by the wholesale server. It defines the area covered, the modes of data handling, the files format and the environment of the server.

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ANNEXE 2 : SERVICES D'INFORMATIONS ROUTIERES AUTORISES PAR LA PERSONNE PUBLIQUE

ANNEX 2 : ROAD INFORMATION SERVICES AUTHORISED BY THE PUBLIC AUTHORITY

This appendix defines the services that the operator is authorised to provide.

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ANNEXE 3 : STRATEGIE D'EXPLOITATION ET DE SECURITE DE LA ROUTE PAR LA PERSONNE PUBLIQUE

ANNEX 3 : STRATEGY ON ROAD NETWORK MANAGEMENT AND SAFETY

The general principles of the strategy on road network management and safety are defined here.

The information supplied to the users must observe the travel policy of the City of Paris as expressed in the "Communication sur les Déplacements" (25 November 1996).

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ANNEXE 4 : CAHIER DES CHARGES POUR LA DIFFUSION DE PRODUITS INFORMATIONNELS RELATIFS AU TRAFIC ROUTIER FOURNIS PAR LA PERSONNE PUBLIQUE

ANNEX 4 : SPECIFICATIONS CONCERNING THE BROADCAST OF ROAD TRAFFIC INFORMATION BY THE PUBLIC AUTHORITY

The Specifications are rules detailing and unifying the law on road traffic information.

It is incorporated by reference in the "Protocole d'accord sur l'information routière en Ile-de-France" (concluded between two public authorities) and in the various contracts between a public authority and private service operators.

There are four articles.

- The first article defines the mission of the public authorities.
- The second article submits the conclusion of a contract with a public authority to a prior authorisation. The conformity of the planned service to the strategy on road network management and safety is tested before an operator is allowed to enter an agreement with a public authority.
- The third article organises the modes of supply of the road traffic information. it also provides that the public authority shall retain all intellectual property rights.
- The last article deals with the rights and obligations of the operator.It contains various rules dealing with subjects as liability, free broadcast of messages of general interest, free supply to the public authority of the information the operator has collected, general and technical regulations applicable, etc.

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ANNEXE 5 : CONDITIONS FINANCIERES

ANNEX 5 : FINANCIAL CONDITIONS

The service operator must pay for the supply of road traffic data.

The royalty is divided into a fixed part and a variable part. the variable part varies according to the number of users. the mode of calculation of the royalty and the time of payment are dealt with.

The appendix also rules on the reduction of the royalty when the public authority fails to supply the data and on penalties when the operator does not meet contractual obligations.

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ANNEXE 6 : AUDIT DE CONTROLE

ANNEX 6 : AUDIT

The public authorities are allowed to have the operators activities checked.

The way the audit should proceed is detailed together with its aims and limits.

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1. National Policy framework

1.1. Policy on development of advanced traffic information services

1.1.1. Overall Framework

The responsibilities for transport issues in Germany are fairly complex, due to the federal structure of the German constitution (Basic Law).

The federal level is (in terms of road transport) in charge of the construction, financing, maintenance and control of the motorway (*Bundesautobahnen*) and federal highway (*Bundesstraßen*) network and for national transport policy issues. In practice however a major part of the day-to-day operative business (including traffic management) is delegated to the federal states (i.e. the ministries of transport of the *Länder*).

The federal states (*Länder*) are, in addition, responsible for police and enforcement issues and operate the traffic data acquisition network through their (state) traffic information centres (*Landesmeldestellen*).

The local authorities (cities and municipalities), which in Germany have the constitutionally guaranteed right of self-government, are in charge of construction and maintenance of their own road network, local traffic planning and the entire traffic guidance and management within their jurisdiction. The provision of public transport services is undertaken by companies, which are mostly under full (direct or intermediate) control of the local authorities. The major local companies have founded regional cooperation networks (*Verkehrsverbünde*).

The major source of funding for local transport infrastructure (road, rail and technical systems) is the *Gemeinde-Verkehrswege-Finanzierungsgesetz* (GVFG), funded by the national government.

Essentially, local authorities have a major role in the organisation of key transport functions in Germany society as compared to other European countries.

1.1.2. Federal Policies

In Germany the car industry and its suppliers are often regarded as the „motors of economy and innovation“ and mobility is a key issue in Germany, both in political debates and among industrial leaders. The safeguarding of advanced transport infrastructures therefore is considered by the federal government as a key precondition for future economic growth. As the German Chancellor Helmut Kohl put it at the opening of the International Automobile Fair in Frankfurt (IAA) on 11. September 1997, the car in Germany is equivalent to personal freedom and is regarded with emotion; Mr. Kohl said that whoever rejects cars „drives into a *cul de sac* and threatens prosperity and jobs.“[1]

[1] Press release IAA, Sept. 1997.

Nonetheless, authorities and private sector stress the need to create an integrated overall transport system in which public transport will have to play a major role.

In this context, federal transport policy principles in Germany are:[2]

- increased attractiveness of public transport and increased intermodal connectivity,
- more efficient use of existing infrastructure
- extension of existing infrastructure, especially in East Germany (where necessary)
- support for large-scale transport telematics implementation.

Key strategic issues of transport policy are the interlinking of and partnership between transport modes, increased competition on the market and the use of telematics.[3] An open legal and competitive environment and a high degree of standardisation and interoperability are considered to have a key role.

In the public discussion in Germany the general term „Telematik" is almost synonymous to „*transport* telematics". Transport telematics is regarded as one of the major growth markets in the next century and increased privately funded activities have clear support from the Federal Minister for Transport, Mr Matthias Wissmann. Among others the national carriers for rail (Deutsche Bahn) and air transport (Lufthansa) and the company operating the dense network of service amenities along the motorways („Tank & Rast") have been gradually privatised, with similar activities for airports and ports being underway. There are also several projects with private road infrastructure financing which is a novelty in Germany. Nonetheless the federal ministry for transport is a major investor with an investment budget of circa10 billion ECU in 1997.[4]

From political statements a clear division of roles between private and public activities is apparent. Basic infrastructure and (control and information) services are the responsibility of the public sector, whereas new value-added and tailored services are to be provided by the private sector.

The key role of the public sector in relation to new telematics-based services is seen to create a liberalised regulatory framework and to assume an enabling and moderating role in the complex German federal system.

The major national players in the transport (and related research) area are:

- the federal ministry (Bundesministerium für Verkehr; BmV), in technical issues supported by the Bundesanstalt für Straßenwesen (BASt),
- the federal ministry for research, science and education (BmBF)

[2] Peter Zimmermann in: Traffic Technology International Oct/ Nov 1997, p. 36.

[3] Frankfurter Rundschau, 17.9.97 (reporting on a high-level discussion at the IAA).

[4] Press release BmV, 1.7. 1977

Coordination with the federal states is established through a standing committee with a rotating chairperson (*Verkehrsministerkonferenz*; VMK);and a number of federal/ *Länder* committees on the working level.

Working relationships with interest groups from industry, the public transport operators' association and the associations of cities and municipalities exist at different levels.

1.1.3. The Federal Economic Forum Transport Telematics

Following a strategy paper on „Telematics in Transport" (1993), in 1995 the Minister for Transport initiated the „Federal Economic Forum Transport Telematics" (*Wirtschaftsforum Verkehrstelematik*). Its objective is to „jointly promote the implementation of transport telematics within an integrative transport concept."[5] Consequently its basic agreement is based on the understanding that[6]

- services which have an effect on the overall transport system should have priority for deployment,
- services should be inter-operable and based on common European standards,
- the introduction of new telematics services is the task of the private sector and the state should create an enabling framework.

The Economic Forum is effectively considered as a „strategic" private-public partnership (in the sense of an „enabling institution", rather than an actual economic activity). Currently members are:

- Federal Minister of Transport (chairman)
- board directors of Ford, Opel, Volkswagen, Mercedes-Benz
- board directors of Siemens, Mannesmann, Bosch
- the President of the major German motorists association ADAC
- the representative of the current acting chairperson of the federal states transport ministers working group (VMK),
- the President of the major organisation of German cities (*Deutscher Städtetag*)
- the President of the association of German public transport companies (VDV) and
- a member of the board of the *Deutsche Bundesbahn AG*

In addition to its top-level representatives, who meet one or two times per year there is working party, called the „Steering Group" from representatives of the same institutions (on the level of managing directors), which meets more often and prepares the formal decisions.

[5] Press Release of BmV, 12.12.95

[6] Press Release of BmV, 12.12.95

The Economic Forum has achieved agreement on „Guidelines on Design and Installation of Information and Communication Systems in Vehicles“ (1996) and was the forum to discuss and prepare the legal framework for new traffic telematics services, notably the model contracts on the use and financial provisions for traffic data exchange from the public to the private sector and on the deployment of private traffic data measurement units on the road network.[7]

Beyond these formal agreements it had also an important „catalytic“ function in the emergence of private traffic information services.

For 1998 the key issues of discussion of the Economic Forum will be:[8]

- to develop a concept for „system architectures“ of data exchange and to raise awareness for the need of private telematics service deployment among the federal states and local authorities,
- to pursue the integration of services across transport modes, i.e. intermodal aspects of new services,
- to develop a national strategy for telematics-based driver support and traffic safety.

1.1.4. National research programmes

In the research and development of transport telematics there are several large RTD programmes run by the Federal Ministry of Transport (BmV) and the research ministry (Federal Ministry of Education, Science, Research and Technology; BmBF).

While the BmV is mainly involved with infastructural initiatives and among others coordinates the introduction of RDS/ TMC in Germany it also runs the DELFI Project which will develop a national intermodal information and reservation system.

The BmBF is sponsoring the MOTIV Project, which is based on the success of the PROMETHEUS Programme. It was founded in 1995 by Adam Opel AG, BMW AG, Daimler-Benz AG, DEBIS Systemhaus GEI, Deutsche Telekom MobilNet GmbH, IBM Deutschland GmbH, ITF Intertraffic GmbH, MAN Nutzfahrzeuge AG, Philips Car Systems GmbH, Robert Bosch GmbH, Siemens AG, and Volkswagen AG. MOTIV is a four year project consisting of two modules addressing

- Mobility in urban areas (sub-projects: integrated mobility and transport network, personal traveller assistance, simulation models)
- Safe roads (sub-projects: turn-off and lane-changing assistance, adaptive cruise control, vehicle-to-vehicle communication, driver assistance strategies, human-machine interaction)

Demonstrations are scheduled in 1999 and a launch strategy is in preparation from 2000 onwards.

[7] These model contracts are described in detail below in section 2.

[8] Interview with BmV, 12.12.97

In the safety and driver assistance area the proposals for a separate research programme are currently being evaluated.

Since 1996 the BmBF is coordinating the „Mobility Research Initiative“ of the federal government in cooperation with the construction and economics ministries, which was approved by the cabinet in December 1996. Under the heading „Maintaining sustainable mobility, while substantially reducing adverse effects of traffic“ project networks have been set-up in the following areas:

- Transport efficiency
- Transport strategies for conurbation
- Minimisation of emissions
- Road safety
- Awareness raising

On the basis of a new approach to concentrate research in large targeted projects (*Leitprojekte*), the Programme „Mobility in Conurbations“ (*Mobilität in Ballungsräumen*) was launched under the „Mobility Research Initiative“ in February 1997. From the 155 pre-proposals, 13 projects have been asked to submit full proposals in February 1998, for which funding of 50,000 ECU is available to proposers. These projects are based in Berlin-Brandenburg, Dresden, Hannover/Braunschweig, Köln, München, Rhein-Main, Rhein-Ruhr, and Stuttgart. In addition some generic projects were pre-selected.

Apparently the intermodal context is very strong in all proposals and new information platforms and services are a key component. All selected projects are in fact large private-public consortia, which have to sign legally binding consortium agreements before submission of the full proposal! The finally selected five or so projects, for which a total funding of 75 MECU is available, are likely to have a significant impact on the development and implementation of new advanced transport services in Germany.

In addition several European Transport Telematics Projects have German implementation sites.

1.1.5. Federal States (*Länder*) Policies

The policies of the federal states vary somewhat with the political orientation of their governments. Nonetheless all *Länder* assume a pro-active approach to transport telematics deployment and support national and local initiatives. While the new eastern states are mainly installing basic infrastructure (which is now often more advanced than in the West), some *Länder* have implemented own programmes (especially Bavaria, Baden-Württemberg, North-Rhine Westphalia, and Lower Saxony). These are described below in section 3.

1.1.6. Local Authorities' Policies

The self government of the cities and municipalities is a basic part of the German constitution and local authorities have actively defended this right also in times of poor economic conditions. Authorities have been facing heavy burdens on their budgets for several years. This was due to costs for reunification, decreasing tax revenues from local companies, and increasing social benefits in a prolonged situation of high unemployment.

Since there are a great number of local authorities with substantial powers it is hardly possible to give a concise overview of the policies regarding the implementation of new transport telematics-based services on the local level. Nonetheless, the following basics are shared by a large number of local authorities in Germany:

- there is a clear political tendency in favour of public means of transport,
- application of telematics is generally considered as an important tool for achieving an efficient transport system,
- especially the larger cities are actively deploying telematics systems (namely in the areas of parking management, traveller and traffic information, traffic management and public transport priority at intersections),
- there is a clear desire to move away from older proprietary systems and to apply open standards and comprehensive system architectures,
- many authorities actively aim to achieve greater efficiency in organisational and economic terms due to their (poor) economic condition, therefore in many cases the political framework is positive towards working in public-private contexts (although there are very few actual examples yet).

The major association of (mainly large) local authorities is the *Deutsche Städtetag*. They have been initially critical towards the deployment of private telematics information services. Key issues were:

- the perceived danger of the private sector taking on essential traffic control functions through in-car guidance systems (thereby counteracting local traffic guidance strategies and undermining access restrictions, routing recommendations and control strategies etc.),
- the (expected) poor data quality and the lack of an overall traffic management concept on the side of new private providers,
- the lack of cooperation agreements and model data exchange contracts with the private sector on the local level,
- the need for a model system architecture for data exchange between the private and public sector (establishment of a network agency; *Netwerk Agentur*).

The *Deutsche Städtetag* is currently discussing the content of model cooperation agreements and data exchange contracts with the private sector. At the same time a few, but large cities are actively pursuing the deployment of telematics systems in close cooperation with industry (cf. case study Cologne).

1.1.7. Public transport

Deutsche Bahn AG the former state company has been privatised for several years now and has begun to introduce modern rolling stock. An online timetable information system is available on the Internet and booking can be done through regional call centres. The company is actively involved in the DELFI project and other initiatives, including European transport telematics projects.

The provision of regional public transport, previously the monopoly of the *Deutsche Bundesbahn*, has been deregulated and local authorities can (in principle) decide to contract regional transport services to any providers. *Deutsche Bahn AG* have still successfully tendered in some regions (e.g. the area of the *Verkehrsverbund Rhein-Sieg* around Cologne). In practice this new element of competition will also ease the introduction of new information services by operators in order to attract new customers.

Local and regional public transport is in Germany (indirectly) controlled by the municipalities. The transport companies are cooperating at regional levels (*Verkehrsverbünde*) and have a national association, the VDV (*Verband Deutscher Verkehrsunternehmen*).

After several years of implementation main telematics applications in local and regional public transport in Germany are in the areas of (mostly static) pre-trip information on timetables and fares, (dynamic) on-trip information at stops/ stations and in vehicles. Many companies are preparing the implementation of advanced electronic fare collection systems when they will have to change their ticket vending machines after the introduction of the common European currency. In the operative area, many companies have automatic vehicle monitoring and control systems (AVL) and there have been many local implementations of public transport priority at intersections. A common interface standard (TRANSMODEL) is implemented.

The VDV strongly supports the provision of intermodal timetable and tariff information by its members to travel information service providers, but demands that this information should be made available free of charge for end users. The service providers would have a substantially higher interest in receiving data on inner-urban traffic conditions from AVL systems (especially from busses and trams floating in the general road network), because this would enable them to receive floating car data which they could then feed into their dynamic car navigation systems. However, the VDV points out that members should be „very careful when they decide to whom they sell their AVL data at which conditions“.[9]

[9] Bernhard E. Nickel, Telematic Applications in German Public Transport, ITS Congress 1997, Proceedings [CD-ROM].

1.2. Allocation of responsibilities between public and private sectors

1.2.1. Legal responsibilities for control and management of traffic

As outlined above, there is a complex sharing of responsibilities between the national government, federal states and local authorities for the control of traffic and for information on traffic conditions. While the control of the motorway network is in practical terms undertaken mainly by the federal states (on delegation from the national government), all local traffic control including public transport operation is the responsibility of cities and local regional authorities.

The key tool of influence of the national government and the federal states on local transport policies are the grants for the financing of new local infrastructure (GVFG).

1.2.2. Practical Arrangements for new services

For the provision of new telematics services there is a clear political tendency to distinguish between (1) freely accessible basic collective information services which should be supplied by the public sector free of charge, and (2) new services which should be provided by the private sector on the basis of new dissemination media and tailored to the requirements of individual users. This distribution of responsibilities between the public and private spheres is strongly supported at the national level and for the greater part also by the *Länder*, but it is also shared by a growing number of urban authorities.

2. Legal framework

2.1. National / regional laws and regulations on advanced traffic information services

2.1.1. Overview

The legal framework for the provision of advanced *private* traffic information services is governed by the **„Information and Communication Services Act“** (*Gesetz zur Regelung der Rahmenbedingungen für Informations- und Kommunikationsdienste*, IuKDG) of 22. July 1997. This law provides the legal framework for the provision of any teleservices, their related data privacy issues and for digital signatures and modifies other existing laws (criminal law, offences, protection of minors, intellectual property rights, pricing).[10]

The key regulation is that teleservices, including traffic-related information and services, can be provided without special licensing or registration. There is no specific liability for the contents of teleservices other than for any other commercial product or service provided (i.e. providers can exclude liability in service agreements with their customers).

Regulations for privacy issues, which are an area of substantial public interest in Germany, restrict the use of personal data to the technically and commercially required minimum. In particular any data on service usage needs to be erased upon completion of the transaction at the latest (except for items which are relevant for billing) and may not be passed on to third parties.

The part on digital signatures regulates the activities of certification institutions and related content and technical issues.

Nonetheless, the Federal Economic Forum had already agreed on additional points in its meeting on 12. December 1995 **(Agreement on the rapid introduction of telematics services in Germany)**:

- Priority is given to telematics services, which improve the entire transport system rather than only „certain parts“ (i.e. modes).
- Services need to be interoperable and in line with European standards.
- While the provision of new services shall be under private sector responsibility, it is the exclusive right of the public sector to define the strategic goals of the transport system.

Industry participants of the Federal Economic Forum thereby confirmed their intention to develop modular and ergonomic products which enable users to select services freely on equipment of their choice, and to provide also non-mode specific services. The public sector (i.e. the federal and state transport ministries) agreed to make their data available and to politically support the provision of new services.

[10] see Annex for details.

At a meeting one year later, in November 1996, the Federal Economic Forum agreed on **„Guidelines for the Design and Installation of Information and Communications Systems in Motor Vehicles“ (HMI Guidelines)**. This agreement recommends that account be taken of the following requirements: (extract; see annexed full text for details)

- Traffic information systems should not result in any impairment of the functions of other systems in the vehicle or of the vehicle itself.
- Information systems should be easy to use.
- It should be possible to switch off the output of information by the system.
- System handling by the passenger should not have a negative effect an the driver.
- Visual information should not be distributed over several display media.
- The position of the information systems should allow the driver to avert his eyes only minimally from the road and the system display should be easy to read.
- The information system should not distract the driver excessively.
- The information system should not require the driver to reply or respond within a specific period of time. The driver must be able to determine the speed of interaction himself or to interrupt it.
- The information provided should, whenever practicable, assist the driver in a timely manner and in line with his requirements. Thus, for instance, routine information should be provided well in advance, to enable the driver to execute the necessary manoeuvre safely.
- Input by keyboard should be minimised while the vehicle is in motion or should be possible when the vehicle is stationary.
- It is recommended that the acoustic information channel be used.

The international agreement of these guidelines and their consideration by CEN and ISO are regarded as „indispensable“.

Both, the HMI Guidelines of 1995 and the Agreement on the rapid introduction of telematics services in Germany of 1996 have the character of a voluntary Memorandum of Understanding between the main stakeholders.

A critical issue for the introduction of new services is whether (and how) private operators are entitled to give alternative routing recommendations to their users. The „Information and Communication Services Act“ does not pose any restrictions, while the basic German road code (*Straßenverkehrsordnung*) defines the public sector to be in charge of the control of traffic and for ensuring the „easy movement“ (*Flüßigkeit*) of traffic. The Federal Economic Forum has agreed that private operators are to consult

with the respective government authorities and respect public control strategies in their own guidance recommendations.[11]

2.1.2. Data Provision from Public to Private sector

In October 1997 the national and federal transport ministers agreed on a model contract for data provision to the private sector.

The model contract, which is recommended for application by the *Länder*:

- excludes any form of liability of the data providers,
- does not guarantee the continuity of data provision and data quality (depends on availability),
- allows private companies to match, combine and transmit the received data freely.

In terms of costs, the model contract allows for free data exchange during the implementation phase of new services and provides flexibility on the amount of payment, which is to be fixed in relation to the commercial interest of the receiving company. Private parties also have to bear the costs for installation, the development of interfaces etc.

[11] Whereas the BmV is supportive of private routing recommendations, some *Länder* and local authorities take a more critical position. Currently, services in Germany are restricted to status information only.

The following restrictions for data provision and fees apply under the model contract:

Data category		Restrictions for data provision	Fees (for commercial purposes)
A	automatically detected data in case of incidents („heavy traffic“ and „stationary traffic“) & diversion recommendations (upon availability)	▪ exchange with transport authorities in other countries for information purposes (no fees) ▪ no restrictions or fees for commercial or public use	none
B	automatically detected data on other traffic conditions (1 minute updates available)	▪ exchange with transport authorities in other countries for traffic control and administrative purposes (no fees) ▪ exchange with private parties under model contract	10-25 ECU per section*
C	detection-point data on network loads and speeds (1 minute updates available)	▪ exchange with transport authorities in other countries for traffic control and administrative purposes (no fees) ▪ exchange with private parties under model contract	25-75 ECU per detection point
D	historical detection-point data (e.g. hourly aggregates)	▪ exchange with private parties under model contract	25-75 ECU per detection point
-	other roadside measurements and operative data	▪ no exchange with third parties	-

* „section“ is the part of a motorway between two exit points

Currently TEGARON and Mannesmann Autocom, as the two major service providers, are using motorway data (category A) via DDG only as a supplementary data source to bridge the gap until own detection equipment is fully installed and occasionally to validate their own data. There is no indication that either of them have a marked interest in entering into any formal data exchange agreement with the federal states under this model contract on a permanent basis.

As Germany is a highly urbanised country and local authorities are also responsible for traffic data acquisition in their jurisdiction, data exchange agreements with them would be highly relevant for the private sector. Apparently the initial resistance, especially of the major association of local authorities *Deutscher Städtetag*, has been changed

towards a more pro-active approach and a model contract for data provision from local authorities to private service providers is in preparation.

In practice there are a number of working arrangements in place where federal states and selected local authorities supply data to private operators, but this is still restricted to pilot tests only.

There is also one example of a local authority (City of Cologne) having agreed a formal contract with the local city net carrier (NetCologne). This example is described in a separate case study.

2.1.3. Private sector data acquisition

As argued in the previous section, the major private sector service operators, TEGARON and Mannesmann, depend marginally on publicly detected traffic data for their services. Instead the two competitors announced the joint establishment of **DDG** (*Gesellschaft für Verkehrsdaten mbH*, Düsseldorf) to set up an entire new private system of data acquisition.

The installation of DDG equipment is based on the **model contract for the installation of roadside equipment** (*Straßenbenutzungsvertrag*) issued by the national transport ministry. The contract grants the right (against payment) to private companies to install and maintain data acquisition and communication equipment „as far as the public use and safety and free flow of traffic are not impaired.“ The technical infrastructure is to be agreed in the contract and the only requirements for its owner are to maintain them in good condition and to accept liability for any damage caused by it. The contract has an initial duration of 10 years, unless cancelled earlier by the equipment owner.

For local authorities a model contract on data exchange is in preparation, the licence for installation of private road side equipment is at the discretion of the municipalities. No example of private large-scale implementation in a city is known.

2.1.4. Practice of Data exchange (examples)

Since DDG mainly relies on its own data, the only permanent supply of traffic data from the main road network to private organisations is to motorists associations like the ADAC, who use it mainly to inform their members.

There is also a large amount of data exchange within the various stakeholders in the public domain. The federal states, police and public radio stations have full access to data (of category A above). Also the RDS/ TMC message generation is based on the extensive data measurement network.

3. Players in the information chain

3.1. Overview

Major actors in the provision of traveller and (road) traffic information services in Germany are as follows:

	Data collection/ editing	Information dissemination/ service provision
public	▪ local/ regional traffic control & information centres ▪ public transport companies	▪ local authorities' VMS, Videotext, telephone enquiry services, Internet pages ▪ public transport operators VMS, Videotext, telephone enquiry services, Internet pages
public-public cooperation	▪ *Länder* and national traffic control & information centres ▪ regional public transport networks (*Verkehrsverbünde*)	▪ public broadcasters' traffic messages & telephone enquiry services ▪ information at stations/ in vehicles by regional public transport networks (spoken announcements and VMS)
private	▪ „congestion reporters" (*Staumelder*) of ADAC touring club ▪ Deutsche Bahn ▪ „congestion finders" of radio stations (e.g. WDR)	▪ telephone enquiries for ADAC members ▪ information at stations/ in trains by Deutsche Bahn (spoken announcements and „VMS" at train stations)
private- private cooperation	▪ Gesellschaft für Verkehrsdaten (DDG)	▪ TEGARON ▪ Mannesmann Autocom ▪ various cooperations of sectoral players (automotive industry, telecom and service providers, equipment manufacturers) with TEGARON & Mannesmann
private-public cooperation	▪ marginal use of data from *Länder* and national traffic control & information centres by	▪ local private broadcasters' traffic messages on local traffic incidents

	Data collection/ editing	Information dissemination/ service provision
	DDG	▪ broadcasting of ADAC congestion reports in public broadcasters' programmes
	▪ MOTIV (pilot project)	▪ MOTIV (pilot project)
	▪ regional and local partnerships (e.g. BAYERNINFO, Hessen-Telematik, MOBIN, MOVE etc.)	▪ regional and local partnerships (e.g. BAYERNINFO, Hessen-Telematik, MOBIN, MOVE etc.)

3.2. Public Sector

There is a large number of well-established and new traffic information services by the public sector:

- Broadcast traffic statements are available in most radio programmes using data from the regional/ national TICs. In addition some stations broadcast Videotext and offer telephone enquiry services
- On many critical sections of the German motorways VMS are in operation, which allow a reduction of the speed of traffic in the case of incidents or severe weather conditions.
- Since recently RDS/ TMC is available throughout Germany.
- Several broadcasters have DAB trials in operation.
- Especially the larger local authorities and public transport companies have been deploying VMS for a considerable time and there are several telephone enquiry services available.
- Local and national authorities are increasingly using Internet as a dissemination tool (e.g. road works information by the BmV, parking information in Cologne, Frankfurt etc.)

While the quality of the free traditional services has sometimes been criticised, there is a clear tendency to use new information media and technical tools in order to achieve better quality of content and to work in new organisational models, both between public institutions and with the private sector.

3.3. Private Sector

3.3.1. Major Players

In the course of 1997 a great number of new services has been announced by industry. There are two major players, which aim at high market penetration on the national level:

- TEGARON, the joint venture of Deutsche Telekom subsidiary T-Mobil and debis Daimler-Benz Interservices, and
- Mannesmann-Autocom with its „PASSO“ service.

The data basis for both services is currently provided by DDG.

These services are described fully as case studies (see annex).

3.3.2. Automotive industry

In addition all major car manufacturers have announced their own services, which are partly being developed with TEGARON and Mannesmann Autocom. Currently the operation of the following plans have been made public:

OPEL have launched their *Initiative Mobilität*, essentially a public relations and campaign, which is also raising awareness for new telematics applications (and related OPEL products). The company is actively cooperating with the federal state Hessen in the Project „Hessen Telematik“.

At the International Automobile Exhibition IAA in Frankfurt this year OPEL and the Hessian transport minister presented the field trial of the *IAA Parkraummanagement System* (parking management system), which collects the parking occupancy data of the Frankfurt parking houses in an OPEL service centre and makes them available on the Internet.[12] These data and general information on traffic conditions in the city and on surrounding motorways are also transmitted via DAB to by the private DAB radio station *Frankfurt Business Radio*. Acoustic and graphical messages are given.

OPEL „OnStar" is an entirely speech-based individual service, planned for release in Germany in late 1997 (after several years of experience in the US). It consists of a mobile telephone (with in-car microphone and speakers for safety reasons) and GPS equipment. A (multi-lingual) service centre gives personal advice via telephone on routes, traffic situations and provides support in emergencies. Additionally messages can be sent via SMS. Future services are planned, e.g. hotel and ticket reservation and „remote vehicle diagnosis in case of breakdowns and theft prevention.“[13] The service will be available 24 hours. Hardware cost will be 750 ECU plus a monthly subscription fee and air time.

[12] http://expo.opel.com

[13] OPEL Press release, 13.3.97.

The OnStar traffic information services will be based on „online data of various European traffic information centres, in Germany provided by the partner organisation ADAC.“[14] OPEL are expecting a turnover of 50 MECU in Germany in the first full year of operation, i.e. 1999.

FORD demonstrated its multi-lingual speech recognition software, developed by its Visteon branch, which is integrated into a car radio/ navigation system at the Berlin ITS Exhibition. Products will be available in Ford cars in 1999. The emergency service „Rescu" is under development. Ford is also participating in the „Cologne Parkinfo“ project (see case study).

BMW, who are participating in several European and national traffic telematics projects, showed the Cologne parking information system at the Berlin ITS event and announced their timetable for telematics product market introduction. Within 1997 point of information data and RDS/ TMC messages were expected for integration in navigation systems. For end 1998 it was announced that RDS/ TMC-based dynamic route guidance, traffic information from service providers, speech recognition to control in-car systems, and advanced emergency services would be available. For 1999 dynamic arrival time forecasts and multimedia travel guides should be available and in 2000 it is planned to have infotainment and rear seat entertainment systems ready.[15]

The GEDAS Telematics business unit of **Volkswagen** was established in October 1997 and was announced at the Berlin ITS Congress. VW, who are currently selling Bosch Travelpilot units (at a price of 1,250 ECU) in VW Passat models, are planning to install new receiver units (to be priced „much less than“ 750 ECU[16]) also in the popular VW Golf cars from mid 1998 onwards. Services will include traffic congestion information, dynamic route guidance, tourism and consumer shopping information as well as emergency calls and breakdown support. Telematics support for fleet operation services is also planned.

Initially GEDAS announced that they would be cooperating with DDG for content acquisition and that there would be „cooperation with Mannesmann and TEGARON in the near future, but the aim is to become market leader“[17]. Meanwhile a cooperation agreement with TEGARON has been signed.

Investments in GEDAS are in the area of 17 MECU in the next two years and the initial staff will be 40.

Mercedes-Benz has started selling „TeleAid“ (see TEGARON case study) and will operate the TeleAid emergency call centre (ECC). In addition to TeleAid, Daimler-Benz showed their Internet-based route planner „Verkehr & Service Online" at the ITS Fair 1997. The system is based on the Nokia Communicator 9000 PDA.

[14] ibid.

[15] cf. leaflet provided at the BMW stand at the ITS Exhibition.

[16] cf. The Intelligent Highway, vol. 8, issue 16 (10.11.97).

[17] ibid.

Porsche are now offering the Siemens „IDIS" (Integrated Driver Information System) in their cars. The exhibit shown at the IAA 1997 provides navigation with dynamic updates through RDS/ TMC, GSM and DAB. It integrates also car phone and radio functions and allows to control the car computer and air conditioning.

3.3.3. Equipment Manufacturers

Equipment manufacturers are traditionally agreeing the supply of OEM versions of their products. For example Bosch Travelpilot is available for Volkswagen/ Audi, Ford, Mercedes-Benz cars. BMW and Opel supply Philips' CARIN, and Porsche have now changed from Bosch to the IDIS Siemens system.[18]

All major equipment manufacturers have announced their plans to provide new user equipment (Bosch-Blaupunkt, Grundig, Alpine, Becker, Clarion, Philips) around the international consumer electronics exhibition in Berlin in 1997. Examples:

- Grundig is launching an off-line navigation system in July 1988 (to be priced 600 ECU) and is pursuing the integration with DAB-based dynamic traffic content.
- Philips Car Systems (now taken over by Mannesmann VDO) showed its „Star Radio" at the recent ITS Fair. It includes a b/w version of CARIN and presented RDS/ TMC-generated icons on the screen.
- Several manufacturers have shown new DAB receivers at fairs in the second half of 1997.

In addition Mannesmann VDO have released plans for „Mobimax" and Skeye announced their „Guide" product.

3.3.4. Other

Tank & Rast AG, now a company being privatised (formerly fully owned by the national state) runs the 700 service utilities along the German motorways. They presented a half year pilot test of 10 fixed terminals at their service areas, named „Autobahn online." PASSO data are transmitted by satellite, in cooperation with Deutsche Telekom and additional multimedia infotainment content is made available through a touch-screen interface. If successful they plan to install over 250 terminals on their service areas until end 1998.[19]

3.4. Private-Public Cooperation

3.4.1. National level

Private-public cooperation at the national level is restricted to strategic cooperation as in the Federal Economic Forum or to pilot research projects like MOTIV, where the

[18] c't - Magazin für Computertechnik, issue 13/ 97 (10.11.97).

[19] Press release, 5.9.97.

BmBF is sponsoring Opel, BMW, Daimler-Benz, debis, Deutsche Telekom, IBM, ITF Intertraffic, MAN, Philips, Bosch, Siemens, and Volkswagen.

3.4.2. Regional and local level

At the regional and local level there are some major alliances between public authorities and private travel and traffic information providers/ service operators. Regional examples include:

- „BAYERN-INFO“, which is part of the Bavarian state programme *Bayern Online*, is running from 1995 to 1998 and aims to set up a state-wide intermodal traffic information centre with forecast and planning functions, regional TIC/ TCC's in the major Bavarian cities of Munich and Nuremberg, an electronic public transport timetable information system, and a Personal Traveller Assistant as front end application.

  Main BAYERN-INFO partners are the Bavarian state, BMW, ITF Intertraffic and Siemens. It collaborates with the TAP/ TR project INFOTEN.[20]

- „Hessen Telematik“, aiming to develop the „Model region for modern traffic management“, is an initiative of the Hessian state and several private companies. RTD elements are also funded by the European ENTERPRICE project.

  It addresses the provision of Internet information on road works on the motorways, integrates urban traffic management and VMS's in Frankfurt, provides public transport traveller information (in a mobility centre and over several communication media) and includes a DAB trial.[21]

- MobIN-BW, *Mobilitätsinformationsnetzwerk Baden-Württemberg*, is the continuation of STORM (formerly part of the DRIVE II Project QUARTET) under participation of the federal state, the City of Stuttgart, ITF Intertraffic, debis, and Siemens.

  The project aims to deliver open access to multimodal traffic and traveller information pre- and on-trip through traffic situation reports, and individual route guidance.[22]

  There was also a DAB trial, the first in Germany.

- The capital of the state of Lower-Saxony, Hanover, will host the EXPO 2000 with 330,000 (!) daily visitors expected every four hours during the five month period. Consequently, a large number of infrastructure and technical measures

[20] Peter Pollesch etal., BAYERINFO, paper presented at Berlin ITS Congress 1997. Gerhard Ploss etal., Aufbau von Verkehrsinformationszentralen - Pilotprojekt BAYERNINFO, Straßenverkehrstechnik, 5/97. Several press releases and brochures.

[21] Jürg Sparmann, Mobility Mangement in Rhein.-Main Region, paper presented at Berlin ITS Congress 1997. Klaus Kienzler etal., Integrierte Leitzentrale für Frankfurt am Main, Straßenverkehrstechnik, 5/97. Several press releases and brochures.

[22] Dieter Geiger etal, MobIN-BW - die Weiterentwicklung urbaner Verkehrsinformationssysteme, Straßenverkehrstechnik, 5/97.

are under way. The INFO-REGIO and MOVE projects are addressing a series of goods and passenger transport-related management and information applications.[23]

In these regional examples several urban authorities are involved.

There is a clear tendency in Germany to establish **Digital Audio Broadcasting** (DAB) as a new transmission medium. Several regional and local trials of DAB are underway in for example in Hessen/ Frankfurt, North-Rhine Westphalia/ Cologne, and Berlin.

The Berlin DAB trial in mid 1997 was conducted on the basis of the Autopilot navigation and traffic information system by GPS Gear, a company based in Würzburg. A Toshiba notebook computer receiving DAB signals from the GPS Gear service centre was used in 300 taxis. The database included information from the Berlin police, broadcasters, the ADAC, and floating car data from taxis. The system supposedly led to journey time savings for half the journeys.[24] Participants in the trial were Deutsche Telekom, the City Information System subsidiary of Bertelsmann, who provided the Autopilot navigation and Streetpilot route planning software. GPS Gear is also working with Mannesmann Autocom and VDO.

[23] Harry-H. Evers etal., INFO-REGIO, paper presented at Berlin ITS Congress 1997. Several press releases and brochures.

[24] cf. The Intelligent Highway, vol. 8, issue 16 (10.11.97).

4. Data collection and management

4.1. National and regional organisational framework

Data collection on motorways in Germany is undertaken by the 16 **federal states**. For purposes of traffic information they collect traffic data in their regional Traffic Information Centres (TIC; *Landesmeldestellen*; LMSt), which interact with the national TIC (*Bundesmeldestelle*, BMST) in Düsseldorf. In addition, police pass on information on incidents to TICs and national and federal authorities supply their data on road works.

Data collected for motorway traffic management (via VMS) is collected in regional control centres and sent to TICs.

The data collection network for the motorways in Germany is particularly dense. For example in the federal state of North-Rhine Westphalia, the 2300 km network is equipped with detection units (inductive loops), which provide updates every minute. Activities are underway to increase the density of detection points and to use traffic modelling software to fill any remaining gaps.

Freely available traffic data gives information on incidents („heavy traffic“ and „stationary traffic“), diversion recommendations, road works and special events. „Raw data“ is defined as automatically detected data on other (i.e. non congested) traffic conditions, especially detection-point data on network loads and speeds and historical detection-point data. Several federal authorities are reluctant to provide raw data on a permanent basis, although the model contract on data provision entitles them to do so. Other available traffic-related data is meteorological and air quality data.

The data is supplied in text format to private operators (e.g. DDG).

Local authorities are responsible for data collection within their jurisdiction. There the density of monitoring equipment is also comparatively high (with local differences). Most commonly inductive loops are used, with video surveillance being not as commonly used as in other countries.

Especially the larger cities have quite sophisticated traffic management systems; and information density is high. In addition, most cities have parking management systems which deliver current parking data. Large public transport companies, which in Germany mostly operate bus and tram services (and Metro systems in some very large cities) have good quality information at least on the status of their rail-based services available, although dynamic passenger information systems are only about to be installed.

4.2. Data acquisition by private Service providers

There is essentially no legal restriction on the provision of travel and traffic information services in Germany (see section 2 above).

Traffic data collected by federal authorities can be supplied to private operates. DDG, the only large receiver, use it in practice only as an intermediate solution or marginally

for validation purposes, mainly because they are critical of the data quality (in terms of aggregation levels and geographic coverage), its timely delivery and its text format.

Instead DDG is in the process of installing roadside equipment (mostly on bridges) on the motorway and on the main (i.e. „federal“) roads network. The units include a solar panel and are linked to the DDG centre via GSM; they are comparable to the Trafficmaster equipment. The data includes lane-specific traffic flows and average speeds. Sensor transmission frequency to the centre can be changed by the sensor itself (in case of incidents) or by the central control. According to DDG the north of Germany is now fully covered and the south will be completed within 1998.[25]

DDG (Deutsche Gesellschaft für Verkehrsdaten GmbH, Düsseldorf) is a joint venture of T-Mobil (which hold 50% of TEGARON) and Mannesmann Eurokom (the Autocom owner). DDG are the major provider of data to TEGARON as well as Autocom. Both companies process the data which they receive from DDG independently to feed their services. In the long term it is expected that floating car data will be used increasingly. It appears to be unclear whether this will also be supplied via DDG or whether the two companies would rely on own data acquisition.

In addition to DDG the only other large-scale private data acquisition is undertaken by the major motorists association, the ADAC. The *Staumelder* (traffic jam reporters) of ADAC collect information on major traffic incidents through staff patrolling the road network by car, motorcycle or helicopter. Occasionally live broadcasts are made in radio programmes.

4.3. Handling of liability issues

There are no legal requirements on quality control of supplied traffic information to users.

For system safety and user-machine interface issues the HMI Memorandum of Understanding has been agreed in the Steering Group of the Federal Economic Forum (see annex and section 2 above).

It is standing practice to disclaim liability between data suppliers and intermediaries and towards end users.

4.4. Use of Standards

The adoption and further definition of formalised and de facto standards is very much promoted by the Federal Economic Forum (as an essential prerequisite in an export-oriented economy) and all major suppliers are committed to their adoption.

The most important new specification under development for emerging travel and traffic information services is GATS (Global Automotive Telematics Standard), which was announced officially during the Berlin ITS Congress by Bosch Blaupunkt, Mannesmann Autocom, Philips Car Systems, TEGARON, VDO, and the VDA. GATS

[25] c’t - Magazin für Computertechnik, issue 13/ 97 (10.11.97).

links GPS and GSM in order to supply tailored high-quality information to advanced in-car navigation, information and „infotainment“ systems.

The GATS development has been coordinated by Mannesmann Autocom and TEGARON and is supported by the automobile industry association VDA (*Verband der Automobilindustrie*) which is representing all major German manufacturers. It is expected that GATS will trigger a wide range of new services and equipment.

TEGARON and Mannesmann have released details of GATS to several interested equipment manufacturers and first prototypes are obviously under testing.

There have been already several releases of first systems based on GATS. Examples:

- The Mobile Hound portable information system, including traffic, tourism, weather information and supporting theft monitoring, fleet management, and messaging applications, have been announced by Engineering ProTime based in Riedering/ Germany.[26]
- Bosch are intending to launch a system to receive Mannesmann Autocom services in April 1998 (in the price range of 1000 ECU) and another system linking these services with the Blaupunkt Travelpilot (with a tentative price of 1500 ECU).[27]
- Skeye Telematic systems in Dortmund showed its „Skeye Guide“ traffic information system at the ITS Exhibition in Berlin. It is based on a Grundig receiver and can receive PASSO or TEGARON services.

Plans for how to release and certify GATS are being negotiated between Mannesmann Autocom and TEGARON at the moment. (see case studies).

[26] cf. The Intelligent Highway, vol. 8, issue 17 (24.11.97).

[27] Announcement by Rudolph Vollmer at the POLIS Conference in Munich 1997; cf. The Intelligent Highway, vol. 8, issue 18 (8.12.97).

5. Discussion

5.1. Measures to promote advanced traffic information services

The main measures to promote advanced traffic information services in Germany have been at the national level the supportive approach taken to

- provide for exchange of information in the Federal Economic Forum and achieve consensus on key issues through Memoranda of Understanding
- define a very liberal legal framework for private operators to launch services and to install their own traffic monitoring equipment
- to provide free and full access to publicly acquired data (although used by private operators only in the initial phases of service introduction)

5.2. Regulation of commercial and semi-commercial services

End user protection in Germany in the area of traffic information services is comparatively weak. There are no quality standards set on the running of information services, and service providers can issue disclaimers in their contracts with end users. Instead market forces are expected to exert quality control in the medium term.

A key issue (mainly for local authorities) is the safeguarding of routing recommendations and other restrictions to be passed on in new services. Private operators emphasize their right to deliver services with the liberal legal framework, although still refraining from giving explicitly dynamic re-routing recommendations to their customers. It is expected that regional and local pilot projects will play an important role in defining a mutually agreeable framework for practical cooperation.

The key remaining issue is the extent to which private operators can provide individual guidance to drivers on the basis of actual traffic conditions.

5.3. Framework for public-private partnerships

The national government is clearly trusting in the private provision of new telematics services in Germany and this strategy has been successful in so far as many services are currently being implemented. Nonetheless, there is not a large extent of cooperation in the operational sense between national/ federal state authorities and private operators (e.g. in data exchange). Most new services are pure private ventures.

Especially on the regional (federal state) level there are a high number of actual partnerships. Most are still in the pilot stage, and it is unclear how these will survive under commercial conditions. At the local level there are only few examples.

In summary, the public sector is interested in and understands the necessity of cooperation with industry, but there are too few reference cases on which to model any real business-type cooperations. The private sector, although aware of the need to get especially urban content into their services soon, appears not to be very pro-active to pursue these cooperations.

6. Conclusions and Recommendations

The market volume for traffic telematics products in Germany in the year 2000 has been estimated to be between 100 and 200 billion ECU.[28]

At the moment a very large number of services are in preparation by the different sectors of German industry, but little is actually available and used by a large number of motorists. This situation is likely to change in 1998 and expectations of industry are high that by 1999 a mass market will be developing.

6.1. What has worked in practice?

Main „success factors“ in Germany for the emergence of new services have been:

- the high (perceived) level of congestion on roads and the high emotional value attached to cars, combined with comparatively high levels of income in Germany which have resulted in high market potentials in early market research prior to the development of new services,
- the support from the national government and the cooperation through the Federal Economic Forum,
- the liberal legal framework in terms of introduction of new services, comparatively low levels of consumer protection, supportive policies for the installation of road-side monitoring equipment,
- broad cooperation within industry in data acquisition and RTD, while maintaining competition on the marketing of services,
- high interest from the automobile industry to use traffic telematics tools as means to increase/ maintain their market shares and consequently to implement new equipment in their vehicles or even to develop own services.

6.2. The key issues

Since both advanced services and end user equipment are well in development, the major issue for a fully developed traffic information market in Germany is not the availability of advanced technical products. Rather issues of content provision, private-public cooperation, and the availability of *inexpensive* mass market products are key to the development of a mass market.

From a policy perspective, the development of high quality content requires services covering the national, regional and local road networks as well as providing multimodal (pre- and on-trip) information and services. Users will be eager to have information on inner-urban traffic situations, parking spaces etc. available and to receive dynamic guidance on alternative routes. Especially cities will require operators to include also information on intermodal travel options (Park&Ride, public transport, car pooling) and to respect their routing strategies and general traffic policies.

[28] c’t - Magazin für Computertechnik, issue 13/ 97 (10.11.97).

Cooperation between the service industry and local and regional (public) content providers is therefore essential for both parties. Authorities can only influence service and content provision (and to a lesser extent generate some revenues) by cooperating pro-actively. On the other hand, industry will not be in a position to fully cover urban traffic conditions by its own data collection on the large level which their users will be expecting before too long. The huge investments involved, the federal structure of Germany and the self-government of cities would be major obstacles of such an approach. Therefore, broad public-private cooperation should be an issue of mutual interest.

As in other application areas of new technologies, the logic of marketing new traffic information services addresses the upper segment of the market first with comparatively expensive products. Key to the development of a large market will be stable and less expensive products which provide a real added value to a large number of users. Before too long, less sophisticated tools (than costly dynamic navigation systems) will be available also on the basis of RDS/ TMC and DAB. These will provide sufficient value to many drivers. They will increase competition between services, and will also help to develop the overall market for traffic information.

7. Case Study „TEGARON"

7.1. History

TEGARON Telematics GmbH was founded as a joint venture of T-Mobil of Deutsche Telekom and debis Daimler-Benz Interservices on 1. July 1997. Both companies had previously actively participated in the Federal Economic Forum and especially its Steering Group.

TEGARON comprises not only experience from the leading German automobile (Daimler-Benz) and the largest European telecom industry (Deutsche Telekom), both companies have previously also separately worked towards the provision of advanced traffic information services through subsidiary companies (e.g. T-Mobil, debis).[29]

TEGARON has a base capital of currently 30 MECU (provided equally by the two founders).

7.2. Goals

The business objectives of TEGARON relate to a „line fitting function" (by enhancing the core market position of its mother companies through attractive OEM products) and an „after sales function" (through the provision of own competitive new products and services, capable of penetrating new markets).

In addition TEGARON is assuming a coordinating role for the provision of advanced traveller information services between the two mother companies.

Three market segments are targeted:

- security products and services (driver support, theft prevention/ alerts, breakdown-related services, remote vehicle maintenance)
- „traffic and efficiency" (i.e. traveller support through intelligent navigation, route guidance, reservation services etc.)
- „infotainment" (tailored applications for different user groups including news services, intermodal trip planning, booking services)

The marketing approach is based on these segments and is clearly targeted to a mass market. The steps are to (1) increase trust in telematics applications among users (emergency or „life insurance" products), (2) mobility services („mobility insurance"), and (3) information and entertainment.

In Germany the availability of products is as follows:

- „Skeye Protect", the theft prevention tool (available since July 1996),

[29] c.f. the real time navigation system ITGS in Tokyo released in April 1997 and developed by debis/ Daimler-Benz and the Japanese police authorities.

- TEGARON traffic information service in operation since autumn 1997, giving location-dependent information on traffic conditions to car drivers via GSM (see detailed description below).
- „TeleAid“, is available for Mercedes-Benz cars since January 1998, and is providing full emergency support including automatically generated calls on the basis of vehicle status information. The service is targeted to achieve a very high net availability of 95% by using several GSM networks (incl. bearer channel as a fall back option) and has been tested extensively.

In addition a number of new services are planned for release in due course:

- The dynamic „AutoPilot“ in-car navigation system.
- Various other travel-related information services which will include breakdown and emergency support and extended travel information services.
- Dynamic navigation and route guidance services will be released in cooperation with motor manufacturers.

In technical terms, the introduction of text-to-speech modules, in-car units with increased storage capacity and processing speed and GPS antennas with higher precision are in development with the manufacturing industry.

7.3. Technical description

The current „TEGARON Info“ traffic information service provides information via GSM telephones on incidents on the German motorways on the basis of data collected by the DDG company and some supplementary information collected by the federal and national TICs. DDG use own traffic monitoring equipment currently being installed on the road network, which is compatible to the Trafficmaster units.

Users can choose to receive spoken messages for generic directions or areas. When dialling the service number they select the area-based or the route-based service and use the telephone keys to indicate their destination (e.g. 2 for north, 3 for north-east etc.). Their location is determined by their GSM cell.

Automatic call backs are generated by the system for a duration of one hour in 15 minute intervals, if changes in traffic conditions occur; otherwise acknowledging calls are issued every 30 minutes. Information includes spoken messages for the area-based service within a 25 km radius, for the route-based service for a 150 km „route“.

The service is available from 6.00 to 23.00 hrs. The information format and service level is currently similar to publicly broadcast information (although the claimed quality is significantly higher).

7.4. Non-technical description

The TEGARON services are based on a private-private partnership of major industrial companies in Germany. Public data is obviously used only marginally as an intermediate solution to bridge gaps in the installation of DDG equipment and to occasionally check the plausibility of own data.

DDG (Deutsche Gesellschaft für Verkehrsdaten GmbH, Düsseldorf) is a joint venture of
T-Mobil (which hold 50% of TEGARON) and Mannesmann Eurokom (the Autocom owner). DDG are the major provider of data to TEGARON (as well as Autocom). Both companies receive raw data from DDG which they process independently to feed their services. In future the addition of other content and services is obviously planned.

In the long term it is expected that floating car data will be used increasingly, and possibly independently by both companies.

TEGARON market and provide the service to the users, the billing is done through the major communication providers (T-Mobil, debitel etc.).

The service costs for „TEGARON Info“ are 0.5 ECU per call plus air time. Considering automatically generated call backs, one hour of travel information costs between 1.5 and 2.5 ECU. There is no subscription charge for the current information services.

7.5. Lessons learned

As TEGARON is on the market for only a very short time, experiences with their services are limited. Especially pro-active mass marketing seems to be held back until additional services are available, therefore little indication can be given on costs acceptance by the market or other budgetary constraints. Obviously no figures have been released by TEGARON at this point.

The outstanding **technical** feature of the future TEGARON (and Mannesmann) services is the joint development of the GATS standard for transmission of traffic and traveller information, which is discussed above in section 4 of the country report. According to TEGARON, GATS is shortly to be published. The specifications were brought into CEN and an agreement process comparable to GSM is envisaged. The non-GATS conforming elements of services (e.g. in „TeleAid“) are expected to be released six months after implementation.

The strategic importance of a full publication of GATS is appreciated and in practice selected equipment manufacturers have received the necessary specifications already. This will shortly produce end user equipment for the services planned by TEGARON and will have a strong bearing on the European market for advanced traveller information.

As privacy issues have a high importance for telematics users in Germany TEGARON have recently also developed an encryption feature to safeguard anonymous use of floating car data. This is also to be published in due course.

Enormous development work is underway to enhance the quality of end user equipment in cars in cooperation with the manufacturing industry.

The other important issue recognised by TEGARON for future market penetration is the availability of high quality **content**. A number of value-added content provider agreements are obviously in preparation.

The TEGARON marketing strategy has defined the provision of high-quality emergency services as first priority, followed by information, booking and „infotainment“ content. While „TeleAid“ has been introduced to the market, content for high-quality traffic information services currently almost fully relies on DDG data. TEGARON obviously envisage to complement (and in the long term substitute) this source through floating car data.

The major gap on the content side is the availability of urban data. In a highly urbanised country like Germany most actual journeys are between inner-city locations, therefore information requests of large user groups are likely to be made on that basis. While TEGARON accept only the (few) legal restrictions in place in Germany on their services and emphasise the right of car drivers to receive personalised information and routing options, there is a discussion mainly with cities, who want to ensure that their restrictions and routing recommendations are respected by any new services. The approach for TEGARON in this context is to cooperate on a case by case basis with individual cities by offering technical support and by establishing some pilot cases. Key issues for the cooperation with the public sector appear to be perceived lacks of efficiency and long-term commitment to justify private investments in the urban information supply chain.

In influencing the **legal framework**, TEGARON was actively involved in the Federal Economic Forum and builds on its agreements. The key item stressed in this context is to speed up the legal process and to define a definite legal framework for the establishment and provision of new services.

7.6. References

There have been several short press articles on TEGARON services (e.g. VDI Nachrichten, Nr. 35, 29.08.97, p. 12). TEGARON maintain a service hotline and have produced some publicity material.

The managing directors of TEGARON are Dr. Peter Mertens and Mr. Hans-Jürgen Hilgendorf, Am Probsthof 74, 53121 Bonn, Tel. +49.228.5201.200/ 100)

7.7. Summary information for TEGARON Traffic Information service

	Main players in the information chain and principal contractual arrangements
Geographical region covered by the service	all national motorways
Relevant authorities	currently some limited cooperation for data acquisition with national/ regional TICs via DDG, later floating car data (see below)
Infrastructure Owners	(- regional/ national TICs) - DDG
Public sector data owners and providers	national/ regional TICs, police
Private sector data owners and providers	DDG (Deutsche Gesellschaft für Verkehrsdaten GmbH, Düsseldorf), a joint venture of T-Mobil and Mannesmann Eurokom, is the major provider of data to both companies. In the long term the emphasis will be on floating car data.
Service operator	TEGARON; a joint venture of T-Mobil of Deutsche Telekom and Daimler-Benz Interservices (debis)
Information editors and service database managers	DDG is providing raw data mainly from own equipment (and regional/ national TICs) to TEGARON and Mannesmann Autocom, who are independently processing and disseminating this information. They will be integrating this information with other sources and services in the near future.
Communications providers	Deutsche Telekom (D1/ C-Net) - for traffic information services (future services will be also available through other GSM providers; e.g. D2 for TeleAid service)
Service provider to the end users (marketing, billing, etc.)	TEGARON (billing is done via major communication providers)

End users: main groups / categories	Currently the main user group appear to be business travellers, in future a mass market is targeted. The general aim is to provide high-quality services on multiple platforms.

	Service Delivery Details
Description of service content	current: - traffic information services (availability from 6.00-23.00 hrs for motorways) ▪ relevant info is requested by user through GSM phone (selection of area or route-based information and overall direction of trip); GSM cell location is sent to service provider to determine position ▪ spoken information on traffic conditions is provided over GSM phone (for area-based service within 25 km radius, for route-based service within 150 km) ▪ automatic call-backs are generated for one hour; if conditions change every 15 min, otherwise every 30 min - „TeleAid“ (automatic emergency call generation and assistance); for Mercedes-Benz cars available since 1.1.97 - „Skeye Protect“ (theft prevention) since July 1996 future plans: ▪ dynamic „AutoPilot“ ▪ various other travel-related information services (e.g. breakdown and emergency, extended travel information) ▪ dynamic navigation & route guidance (incl. reservation services for parking, hotels, etc.) ▪ security-related services (theft alerts, remote maintenance) ▪ „infotainment“ services (incl. news updates, intermodal trip planning, enhanced booking)

Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	current: real time traffic data on network incidents from ▪ national/ regional TICs (mostly aggregated data, based on inductive loop measurements on motorways) - *used to a marginal extent only* ▪ DDG (data detected through own equipment on travel speeds and -in future - travel times) future: ▪ floating car data (planned from mid 1999, except for large conurbations; due to insufficient GPS transmission density)
Transmission media used	GSM
Market segments targeted	Officially published figures target for year 2000 a turnover of 100 MECU (of an estimated 200.000 MECU sized market in Europe, i.e. 5%). In general terms „a strong market position“ in the high-quality telematics service market is targeted.
Service pricing policy	1 DM (i.e. 0.5 ECU) per call (plus every automatic call back), plus air time (D1 net).
Strategic marketing partnerships	TEGARON is a joint venture of the leading German automobile (Daimler-Benz) and telecom (Deutsche Telekom) industries. Joint marketing agreements are signed with other automobile manufacturers (Volkswagen and MCC; in addition to Mercedes-Benz) and equipment manufacturers; others are in preparation. Related content providers will be suppliers of value-added information.
Nature of any Public / Private partnership	Apart from (informal) data exchange agreements with national/ regional TICs and cooperation on the strategic level, TEGARON appear to have no intention to formalise private-public partnerships. Although a „consulting“ and support mechanism with local authorities seems to be envisaged in the medium term. Extensive experiences have been gained in the Intelligent Traffic Guidance System (ITGS) with Tokyo.
Main revenue streams	current services: air time and service charge

8. Case Study „PASSO“

8.1. History

Mannesmann Autocom was founded as a 100% subsidiary of Mannesmann Eurokom in April 1995, which is part of the Telecommunications Group of Mannesmann AG. The other companies in this group are Mannesmann Mobilfunk (providing the „D2 Privat“ GSM services) and Mannesmann Arcor (providing telephony services from 1.1.1998). Other subsidiaries of Mannesmann AG include VDO, the car equipment manufacturer.

Mannesmann Autocom employ 170 staff.

Starting in April 1996 Mannesmann had participated in the VERDI trial (Vehicle Relayed Dynamic Information) in North-Rhine Westphalia jointly with the regional ministry of transport and the ADAC. In VERDI 1000 floating cars were used and the ministry made their regional TIC data available.

Mannesmann have also actively participated in the Federal Economic Forum and its Steering Group.

8.2. Goals

The core business of Mannesmann Autocom is the processing and transfer of traffic information. Their services are based on GSM and GPS technologies and a strategy of technologically open service provision is stressed by the company.

The market segments targeted by Autocom services in the „base range“ are:

- spoken message delivery of regional traffic information via GSM at no additional hardware cost (for OEM market); or in the price range of ECU 35 additional hardware cost (for after sales market)

In the mid range the following segments are targeted:

- in-car terminal integrating graphical and spoken traffic information and telephony („Verkehrs- Telematik Telefon“) in the price range of ECU 700 hardware cost; plus subscription and transaction fees
- „Verkehrs-Telematik Telefon“ including also security functions in the price range of ECU 1050 hardware cost; plus subscription and transaction fees

In addition, sophisticated navigation equipment is planned for the top end of the market in the price range of ECU 1650 hardware cost; plus subscription and transaction fees.[30]

Mannesmann Autocom are currently providing the „PASSO“ information services, which has now substituted the traffic information service of the (Mannesmann) „D2 Privat“, and the „PASSO Fleet“ service for freight traffic applications.

[30] Prices of hardware indicative only; correct as of September 1997.

For „PASSO“ individual motorists are targeted to receive:

- traffic information services (according to Mannesmann market research this is the information category requested by one half of the prospective users as a first priority)
- breakdown and emergency call services (requested by one quarter as first priority)
- navigation services (requested only by 15% as first priority)
- additional information services

For „PASSO Fleet“ freight and fleet operators are targeted to receive:

- vehicle communication between fleet vehicles and dispatchers
- vehicle reckoning for fleet vehicles
- traffic information for fleet vehicles and dispatchers
- other fleet-related applications (planned for example are emergency and breakdown services, route planning and freight logistics applications)

Autocom have very actively marketed „PASSO“ in the past months through press advertisements and the company clearly targets a mass market.

The „visionary contribution“ of Autocom to transport telematics is:

- to transmit intermodal mobility information to motorists (including inner-city information)
- to provide individual Navigation Support Services services and point-of-interest information
- to work on an open communication platform, enabling users to receive PASSO services on a range of platforms
- to provide new mobility content (to be „bundled“ within PASSO)

The aim is to provide a wide range of integrated services within PASSO, available under one telematics terminal as for example the VDO MobiMax, but users will be free to use also technical equipment supplied by other manufacturers.

Since March 1997 „PASSO“ is available for D2 subscribers. The service includes incident information for the following categories:

- area information for 10 large conurbations
- information for specific motorways and „federal roads“ (i.e. trunk roads)
- route information (origin to destination for currently ca. 140 cities)

For „PASSO Fleet“ availability is as follows:

- vehicle communication and reckoning since end 1996
- vehicle control functions (planned for end 1997)

The following extensions are planned for the PASSO services for release in due course:

- breakdown calls with positioning (was planned for end 1997)
- in-car route guidance services in the first quarter of 1998
- paging services (end 1998)
- further extensions to fleet-related applications are planned for 1998

8.3. Technical description

The current Autocom „PASSO“ traffic information service provides information via GSM telephones on incidents on the German motorways and trunk roads on the basis of data collected by the DDG company and (to a marginal extent only) supplementary information collected by the federal and national TICs. DDG use own traffic monitoring equipment currently in installation on the road network, which is compatible to the Trafficmaster units.

Users can select specific roads and areas by dialling the road/ motorway number or an area number on their GSM phone. They can also request information on routes by supplying a destination code (i.e. the telephone prefix of the city). Their location is determined by supplying an additional start area code. After having made the information request either through a voice interactive menu or by dialling codes directly, they receive a spoken message with the major incidents on their selected routes or areas.

Since the „PASSO“ allows users to directly dial into a specific service branch users can save codes for their standard information requests in the memory of their mobile telephone and thus have a very efficient way of accessing detailed information rapidly (e.g. the number 2266635 gives current travel messages for the Rhineland area).

„PASSO“ is available 24 hours every day. The information format and service level is currently similar to publicly broadcast information (although the claimed quality is significantly higher).

8.4. Non-technical description

The Mannesmann Autocom services use public data (via DDG) obviously only as an intermediate solution to bridge gaps in the installation of DDG equipment. Currently „PASSO“ relies fully on DDG data, according to Autocom.

DDG (Deutsche Gesellschaft für Verkehrsdaten GmbH, Düsseldorf) is a joint venture of T-Mobil and Mannesmann Eurokom (the Autocom owner). DDG are the major provider of data to Autocom. Autocom receive raw data from DDG which they process independently to feed their services. In future the addition of other content and services is obviously planned.

„PASSO“ allows users considerable flexibility in the selection of information. For the future the addition of other content and services is obviously planned.

Mannesmann Autocom realise the benefits of floating car data and aim to use it increasingly.

Mannesmann Autocom market and provide the service to the users. For the PASSO Traffic Information Service via telephon the billing for this D2 „PASSO“ service is done through the communication provider to the „D2 Privat“ customers.

The service costs are ca. 0.8 ECU per minute plus air time. There is no subscription charge.

8.5. Lessons learned

As Mannesmann Autocom is on the market only for a short time, experiences with their services are limited and no details on service usage have been released at this point.

The outstanding **technical** feature of the future Mannesmann Autocom services is the joint development of the GATS standard for transmission of traffic and traveller information, which is discussed above in section 4 of the country report. It was confirmed by Mannesmann Autocom that modalities for a general release of GATS are currently discussed among the developers and an agreement process comparable to GSM is envisaged to start in 1998. Autocom representatives pointed out that selected equipment manufacturers have received the necessary specifications already upon signing a confidentiality agreement. It was emphasised that barriers for using GATS by other suppliers should be kept low and access should be open in principle. Nonetheless there are worries on how to safeguard the full compliance with the standard after release and how to fund and administer future development work. In principle GATS is intended as a global standard. Possibly the feasibility of a national licensing mechanism needs to be investigated according to Autocom.

Also Mannesmann Autocom realise the importance of high quality **content** for future market penetration. The core commodity „traffic information“ consists of services in the areas of dynamic traffic information, breakdown support and dynamic navigation. Other value-added services are planned by Autocom for the following year.

Mannesmann have defined the provision of traffic information services and emergency support as a first priority for „PASSO“. Route planning and navigation support are expected for release later in 1998. Cooperation within the Mannesmann group is naturally strong (with D2 and with VDO, who supply the „Mobimax“ terminal). Cooperation with receiver manufacturers seems to be close; the take-over of Philips Car Systems by the Mannesmann group has been announced at the end of last year.

Autocom, have no dynamic data on urban traffic conditions available up to now. And they point out that they are not prepared to accept other than the (few) legal restrictions on the provision of advanced traveller and traffic information which are in place in Germany. But they are at the same time prepared to follow a pragmatic approach to ensure that traffic restrictions and routing recommendations (e.g. of cities) are respected by „PASSO“; for example by implementing agreed restrictions for inner-urban routes as algorithms in their system.

In terms of **regulatory and policy** issues Mannesmann Autocom was also actively involved in the Federal Economic Forum and builds on its agreements. The key item for Autocom is to define a clear legal framework for new services, which would avoid potential conflicts in the implementation of new services and would provide a stable framework (i.e. independent of changes in government) to justify future large-scale investments.

8.6. References

In addition to various press articles, Mannesmann Autocom maintain a service hotline and have produced some publicity material.

Presentations by Mannesmann Autocom representatives have been given at the TAP/ TR concertation meeting in September 1997 and at the POLIS Conference in November 1997.

The managing director of Mannesmann Autocom is Mr. Helmut Gerner,
Niederkasseler Lohweg 20, 40547 Düsseldorf, Tel. +49.211.5368.100).

8.7. Summary information for PASSO service

	Main players in the information chain and principal contractual arrangements
Geographical region covered by the service	all national motorways and „federal roads“ (*Bundesstraßen*, i.e. trunk roads)
Relevant authorities	previously cooperation within VERDI; currently some limited cooperation for data acquisition with national/ regional TICs via DDG; later FCD (see below)
Infrastructure Owners	(- regional/ national TICs) - DDG
Public sector data owners and providers	national/ regional TICs, police
Private sector data owners and providers	DDG (Deutsche Gesellschaft für Verkehrsdaten GmbH, Düsseldorf), a joint venture of T-Mobil and Mannesmann Eurokom, is the major provider of data to both companies. In the long term the emphasis will be on floating car data.
Service operator	Mannesmann Autocom
Information editors and service database managers	DDG is providing raw data mainly from own equipment (and regional/ national TICs) to Mannesmann Autocom, who is processing and disseminating this information.
Communications providers	Mannesmann Mobilfunk („D2 Privat“), open to other GSM-Network operators
Service provider to the end users (marketing, billing, etc.)	Mannesmann Autocom (billing could also be done via communication provider)
End users: main groups / categories	Currently the main user group appear to be business travellers, in future a mass market is targeted. The general aim is to provide advanced travel and traffic information services on multiple platforms.

	Service Delivery Details
Description of service content	current: ▪ relevant info is requested by user through GSM phone (selection of area, road or route-based information branch) ▪ spoken information on traffic conditions is provided over GSM phone ▪ the service is permanently available ▪ Fleet services future plans: ▪ breakdown calls with positioning (is planned for 1st quarter of 1998 in-car route guidance services in the 3rd quarter of 1998 ▪ (further extensions to „PASSO Fleet“ applications are planned for 1998)
Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	current: real time traffic data on network incidents from ▪ national/ regional TICs (mostly aggregated data based on inductive loop measurements on motorways) - *used marginally only* ▪ DDG (data detected through own equipment on travel speed and -in future - travel times) future: ▪ floating car data (planned from mid 1999, except for large conurbations; due to insufficient GPS transmission density)
Transmission media used	GSM
Market segments targeted	„a large share of an enlarged mass market“; different market segments will be targeted by different end user equipment capable to receive services of different quality
Service pricing policy	costs are ca. 0.8 ECU per minute plus air time; there is no subscription charge for telephone based traffic information in the GSM-networks.

Strategic marketing partnerships	Within the Mannesmann group of companies Mannesmann Mobilfunk (providing the D2 GSM services) and VDO, the car equipment manufacturer. The take-over of Philips Car Systems has been announced last year. In addition, Mannesmann is expecting to make its services available for a range of equipment by other manufacturers.
Nature of any Public / Private partnership	Apart from (informal) data exchange agreements with national/ regional TICs and cooperation on the strategic level, Autocom appear to have no intention to formalise private-public partnerships.
Main revenue streams	air time and service charge

9. Case Study „Private-Public Cooperation in Cologne“

9.1. History

The City of Cologne is one of the most active German cities in European telematics programmes and has implemented particularly advanced telematics infrastructure over the last five years. The local *Programm Verkehrstechnik* (PVT), funded through local, federal state and national funds, has defined a long-term policy framework and ensured the introduction of sophisticated traffic control and information systems in the city. A parking guidance and information system is available since 1986.

Timely and reliable information on the traffic situation in the city has high political priority and consequently up to date information is available through Videotext, T-Online, VMS, and is broadcast over the local radio network. A service centre can be called free of charge to get individual information.

Since late 1996 the project „Cologne Parkinfo“ has been started as a private-public partnership between the car manufacturers BMW and Ford, communication providers Cellway and NetCologne, Siemens, the Technical University of Aachen and the City of Cologne. The project aims to provide information on parking facilities within or close to the city centre which are provided by 29 parking houses and four P&R parking spaces with a total of 16,000 spaces.

In addition the city administration has signed an agreement with NetCologne to act as the exclusive provider of dynamic traffic-related data to third parties and to jointly market traffic data with the urban authority.

9.2. Goals

„Cologne Parkinfo“ aims

- to set up a private-public provider structure for new traffic information services
- to integrate dynamic traffic data within autonomous navigation systems

while respecting the authority’s transport policies.

The first project stage includes the provision of parking occupancy data (plus a short-term forecast) for each parking house and to support navigation to the selected parking facility. For one parking house reservation and electronic payment functions will be implemented. The three month pilot trial, which is starting in early 1998, will assess the user benefits, user perceptions and market potential.

In the next stages other dynamic traffic data will be transmitted to in-car units, e.g. traffic incidents and road works, special events (e.g. by applying software agents and by using multimedia platforms).

9.3. Technical description

Parking occupancy data is transmitted to the urban TCC/ TIC via dedicated lines and sent to the VMS and parking information system after processing. Within „Parkinfo“ a standardised interface sends the data also to service providers:

- NetCologne receive the data for publication on the Internet, where users can get information on free parking spaces for every parking house (and related occupancy forecasts) in a dynamic map.
- *Westdeutscher Rundfunk* (WDR), the Cologne-based public broadcaster for the region of North-Rhine Westphalia transmit the data via Digital Audio Broadcasting (DAB).
- Cellway sent the data via the GSM Short Message Service (SMS) to in-car units in BMW and Ford test cars.

Future plans include information on intermodal transport options and the technical support for activity chains with integrated information and booking/ payment functions.

Outside „Parkinfo“ NetCologne has announced to make live video images of major road bottlenecks (e.g. the bridges over the Rhine) available over Internet. Plans for a call centre are also in preparation.

9.4. Non-technical description

The City of Cologne actively disseminate free traffic information on collective information media (VMS, service centre, online etc.) on a high technological level. But also a pro-active policy is being implemented for developing individualised high-quality information services within private-public partnerships. Reasons given by the city administration are the participation in revenues from selling valuable data, the aim of enhancing traffic efficiency within the available infrastructure, and - mainly - ensuring that restrictions and recommendations issued by the local road authority are also integrated within advanced in-car systems.

The legal environment for public authorities in Germany to operate in a fully commercial environment are generally considered difficult and little experiences have been made so far. The approach chosen by the City of Cologne therefore was to enter into an agreement for traffic data provision with the local city carrier, NetCologne, a commercial company indirectly controlled by the city. This agreement includes:

- NetCologne is the exclusive receiver of traffic-related data from the local road authority (except for freely provided data to maintain free information services); they may process, enhance, disseminate and sell this data to third parties.
- The selling of data needs to be agreed with the City of Cologne and receivers of data are bound to respect the local road authority’s recommendations and other restrictions in their information services and will disseminate own routing recommendations only within a defined main road network.

- The City of Cologne accepts no liability for the data supplied (or failed to supply).
- The City of Cologne participates in the revenue streams generated by the data supplied to NetCologne on a percentage basis.

Currently the pilot project „Cologne Parkinfo“ is in its validation phase and restricted to test users only. Freely accessible is the information supplied by NetCologne on their Internet page. This includes the parking-related information, a general weekly traffic prognosis, an overview of road works likely to influence traffic conditions and planned major service interruptions of the local public transport company.

9.5. Lessons learned

Market research undertaken within „Cologne Parkinfo“ confirms users' readiness to pay for advanced traffic information and services.

The technical framework in Cologne is characterised by a very high standard and is therefore a suitable site to implement new services on a variety of technical platforms (SMS, Internet and DAB in addition to collective dissemination media like VMS, Internet etc.).

The political framework enables the implementation of these services by laying emphasis on pro-active information strategies and by supporting private-public cooperation. This is facilitated by special local conditions as for example the fact that NetCologne is a company ultimately controlled by the city administration and by Ford being a major industrial manufacturer in Cologne (and local taxpayer).

NetCologne is in the process of establishing itself as a large local internet and telephony service provider and therefore has a marked interest to make high-quality content available to its customers. This interest is shared by the participating car manufacturers, who are also eager to make urban traffic information available in their in-car navigation systems.

The factors considered to be crucial for the introduction of new transport telematics services on German cities therefore are:

- confirmed market interest
- advanced technical framework
- pro-active approach and political support to work in private-public partnerships
- mutual interest to produce high-quality content

On this basis the large-scale implementation of new traffic and travel information services appears realistic in cities as Cologne.

9.6. References

Cologne traffic information and a project description of „Cologne Parkinfo“ is available on the Internet (http://www.netcologne.de/koelnverkehr.htm).

9.7. Summary information for Travel Information Services in Cologne

	Main players in the information chain and principal contractual arrangements in place
Geographical region covered by the service	area of the City of Cologne
Relevant authorities	City of Cologne
Infrastructure Owners	City of Cologne
Public sector data owners and providers	City of Cologne
Private sector data owners and providers	car manufacturers BMW and Ford, communication providers Cellway and NetCologne, and Siemens AG
Service operator	Cellway and NetCologne
Information editors and service database managers	City of Cologne (NetCologne are free to enhance the data and add services in the future)
Communications providers	Cellway and NetCologne
Service provider to the end users (marketing, billing, etc.)	Cellway and NetCologne
End users: main groups / categories	general public (currently only test users, except for Internet site)

	Service Delivery Details
Description of service content	current: ▪ provision of parking occupancy data (plus a short-term forecast) for each parking house in the city via DAB and SMS to BMW and Ford in-car equipment and to NetCologne Internet site ▪ for one parking house reservation and electronic payment functions will be implemented future plans: ▪ other dynamic traffic data will be transmitted to in-car units, e.g. traffic incidents and road works, special events (e.g. by applying software agents and using multimedia platforms).
Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	current: ▪ real-time data on available parking spaces in all inner-city parking houses (updated every 15 min.) ▪ rough prognosis of trend for each parking house
Transmission media used	GSM (SMS), DAB, Internet protocol
Market segments targeted	general public
Service pricing policy	Internet service currently free of charge; „Parkinfo“ only in test stage
Strategic marketing partnerships	car manufacturers BMW and Ford, communication providers Cellway and NetCologne with City of Cologne
Nature of any Public / Private partnership	„Cologne Parkinfo“ partnership between car manufacturers BMW and Ford, communication providers Cellway and NetCologne with City of Cologne and separate data provision contract of NetCologne with City of Cologne.
Main revenue streams	no information available

10. Summary of the Information and Communication Services Act

Federal Ministry of Education, Science, Research and Technology

Federal Act Establishing the General Conditions for Information and Communication Services - Information and Communication Services Act -(Informations- und Kommunikationsdienste-Gesetz - IuKDG); August 1 1997

T a b l e o f C o n t e n t s

Article 11

Entry into Force

Article 1

Act on the Utilization of Teleservices (Teleservices Act - Teledienstegesetz TDG)

§ 1: Purpose of the Act

The purpose of this Act is to establish uniform economic conditions for the various applications of electronic information and communication services.

§ 2: Scope

(1) The following provisions shall apply to all electronic information and communication services which are designed for the individual use of combinable data such as characters, images or sounds and are based on transmission by means of telecommunication (teleservices).

(2) Teleservices within the meaning of § 2 (1) shall include in particular:

1. services offered in the field of individual communication (e.g. telebanking, data exchange),

2. services offered for information or communication unless the emphasis is on editorial arrangement to form public opinion (data services providing e.g. traffic, weather, environmental and stock exchange data, the dissemination of information on goods and services),

3. services providing access to the Internet or other networks,

4. services offering access to telegames,

5. goods and services offered and listed in electronically accessible data bases with interactive access and the possibility for direct order.

(3) § 2 (1) shall apply irrespective of whether the use of the teleservices is free of charge either wholly or partially.

4) This Act shall not apply to

1. telecommunications services and the commercial provision of telecommunications services under § 3 of the Telecommunications Act of 25 July 1996 (Telekommunikationsgesetz, Federal Law Gazette BGBl. I, page 1120),

2. broadcasting as defined in § 2 of the Interstate Agreement on Broadcasting (Rundfunkstaatsvertrag),

3. content provided by distribution and on-demand services if the emphasis is an editorial arrangement to form public opinion pursuant to § 2 of the Interstate

Agreement on Media Services (Mediendienste-Staatsvertrag) signed between 20 January and 7 February 1997.

(5) Legal provisions concerning press law remain unaffected.

§ 3: Definitions

For the purposes of this Act

1. the term "providers" means natural or legal persons or associations of persons who make available either their own or third-party teleservices or who provide access to the use of teleservices,

2. the term "users" means natural or legal persons or associations of persons requesting teleservices.

§ 4: Freedom of access

Within the scope of the law, teleservices shall not be subject to licensing or registration.

§ 5: Responsibility

(1) Providers shall be responsible in accordance with general laws for their own content, which they make available for use.

2) Providers shall not be responsible for any third-party content which they make available for use unless they have knowledge of such content and are technically able and can reasonably be expected to block the use of such content.

(3) Providers shall not be responsible for any third-party content to which they only provide access. The automatic and temporary storage of third-party content due to user request shall be considered as providing access.

(4) The obligations in accordance with general laws to block the use of illegal content shall remain unaffected if the provider obtains knowledge of such content while complying with telecommunications secrecy under § 85 of the Telecommunications Act (Telekommunikationsgesetz) and if blocking is technically feasible and can reasonably be expected.

§ 6: Identification of providers

Concerning commercial offers, providers shall indicate:

1. their name and address as well as,

2. in case of associations and groups of persons, the name and address of their authorized representative.

Article 2

Act on the Protection of Personal Data Used in Teleservices (Teleservices Data Protection Act - Teledienstedatenschutzgesetz TDDSG)

§ 1: Scope

(1) The following provisions shall apply to the protection of personal data used in teleservices within the meaning of the Teleservices Act.

(2) Unless otherwise provided in this Act, the relevant provisions concerning the protection of personal data shall be applicable even if the data are not processed or used in data files.

§ 2: Definitions

For the purposes of this Act

1. the term "providers" means natural or legal persons or associations of persons who make available teleservices or who provide access to the use of teleservices,

2. the term "users" means natural or legal persons or associations of persons requesting teleservices.

§ 3: Principles for the processing of personal data

(1) Personal data may be collected, processed and used by providers for performing teleservices only if permitted by this Act or some other regulation or if the user has given his consent.

(2) The provider may use the data collected for performing teleservices for other purposes only if permitted by this Act or some other regulation or if the user has given his consent.

(3) The provider shall not make the rendering of teleservices conditional upon the consent of the user to the effect that his data may be processed or used for other purposes if other access to these teleservices is not or not reasonably provided to the user.

4) The design and selection of technical devices to be used for teleservices shall be oriented to the goal of collecting, processing and using either no personal data at all or as few data as possible.

(5) The user shall be informed about the type, scope, place and purposes of collection, processing and use of his personal data. In case of automated processing, which permits subsequent identification of the user and which prepares the collection, processing or use of personal data, the user shall be informed prior to the beginning of the procedure. The content of such information shall be accessible to the user at any time. The user may waive such information. A record shall be made of the information and the waiver. The waiver shall not constitute consent within the meaning of § 3 (1) and (2).

(6) Before giving his consent, the user shall be informed about his right to withdraw his consent at any time with effect for the future. Sentence 3 of § 3 (5) shall apply mutatis mutandis.

(7) Consent can also be declared electronically if the provider ensures that

1. such consent can be given only through an unambigious and deliberate act by the user,

2. consent cannot be modified without detection,

3. the creator can be identified,

4. the consent is recorded and

5. the text of the consent can be obtained by the user on request at any time.

§ 4: Obligations of the provider

(1) The provider shall offer the user anonymous use and payment of teleservices or use and payment under a pseudonym to the extent technically feasible and reasonable. The user shall be informed about these options.

(2) The provider shall take technical and organizational precautions to ensure that

1. the user can break off his connection with the provider at any time,

2. the personal data generated in connection with the process of requesting, accessing or otherwise using teleservices are erased immediately upon conclusion of the procedure unless further storage is required for accounting purposes,

3. the user is protected against third parties obtaining knowledge of his use of teleservices,

4. personal data relating to the use of several teleservices by one user are processed separately; a combination of such data is not permitted unless it is necessary for accounting purposes.

(3) The user shall be notified of any reforwarding to another provider.

(4) User profiles are permissible under the condition that pseudonyms are used. Profiles retrievable under pseudonyms shall not be combined with data relating to the bearer of the pseudonym.

§ 5: Contractual data

(1) The provider may collect, process and use the personal data of a user to the extent necessary the data are required for concluding with him a contract on the use of teleservices and for determining or modifying the terms of such contract (contractual data).

(2) Processing and use of contractual data for the purpose of advising, advertising, market research or for the demand-oriented design of the teleservices is only permissible if the user has given his explicit consent.

§ 6: Utilization and accounting data

(1) The provider may collect, process and use personal data concerning the use of teleservices only to the extent necessary

1. to enable the user to utilize teleservices (utilization data) or

2. to charge the user for the use of teleservices (accounting data).

(2) The provider shall erase

1. utilization data as soon as possible, at the latest immediately after the end of each utilization, except those that are at the same time accounting data,

2. accounting data as soon as they are no longer required for accounting purposes; user-related accounting data stored by the provider for the establishment of detailed records concerning the use of particular services at the user's request in accordance with § 6 (4) below, shall be erased not later than 80 days from the date of dispatching the detailed records unless the request for payment is disputed within this period or the invoice has not been paid despite a demand for payment.

(3) Utilization or accounting data shall not be transmitted to other providers or third parties. This shall not affect the powers of criminal prosecution agencies. The provider offering access to the use of teleservices must not transmit to other providers whose teleservices have been used by the user any data other than

1. anonymised utilization data for the purposes of their market research,

2. accounting data to the extent necessary for collecting a claim.

(4) If the provider has concluded a contract with a third party concerning the provision of accounting services, he may transmit to the third party accounting data necessary for rendering such services. The third party shall be obligated to comply with telecommunications secrecy.

(5) The invoice concerning the use of teleservices must not reveal the provider, time, duration, type, content and frequency of use of any particular teleservices used unless the user requests such detailed records.

§ 7: User's right to information

The user shall be entitled at any time to inspect, free of charge, stored data concerning his person or his pseudonym at the provider's. The information shall be given electronically if so requested by the user. If data are stored only for a short period in accordance with § 33 (2) Nr. 5 of the Federal Data Protection Act [Bundesdatenschutzgesetz], the user's right to information shall not be excluded by § 34 (4) of the Federal Data Protection Act.

§ 8: Control

(1) § 38 of the Federal Data Protection Act shall be applicable with the proviso that an examination may be carried out even if there are no grounds to suppose that data protection provisions have been violated.

(2) The Federal Commissioner for Data Protection shall observe the development of data protection as applied to the provision and utilization of teleservices and shall make relevant comments in the activity report he has to submit pursuant to § 26 (1) of the Federal Data Protection Act.

11. Guidelines for the Design and Installation of Information and Communications Systems in Motor Vehicles

Steering Group on the Economic Forum on Telematics in Transport, Bonn, November 1996

Agreement

on Guidelines for the Design and Installation of Information and

Communications Systems in Motor Vehicles

Developments in the sphere of guidance, information and communications technology will result in crucial contributions towards solving transport problems in the field of road traffic. The following aspects, in particular, are of far-reaching significance:

- *the meshing and interconnecting of modes of transport in an integrated overall transport system;*
- *a more efficient use of the transport infrastructure of all modes of transport;*
- *enhancing road safety and reducing environmental pollution;*
- *traffic avoidance and shifting traffic to more environment-friendly modes of transport.*

The relevant systems, which either exist or are in development, are designed to assist the driver in performing his function of driving his vehicle, but they **also** make claims on his attention. To ensure that the use of such systems does not impair road safety, it is necessary to ensure that the licensing and design of these systems comply with certain requirements.

Politicians, the vehicle industry and system suppliers have a common interest in establishing a high level **of** road safety, if possible throughout Europe, which also provides a sound basis for the licensing and marketability of innovative products. An agreement on guidelines for the design and installation of information and communications systems in motor vehicles will create a common basis on which the public sector and industry can tackle the tasks they face. It can also provide orientation for systems under development.

The design and installation of information and communications systems in motor vehicles call for the short- and medium-term implementation of findings from the following fields:

- *Road safety*,(providing safe assistance to the driver in road traffic);
- *System safety* (reliability of systems, suitability for international approval and monitoring, e.g. also electromagnetic compatibility);
- *Interaction safety* (design of the man-machine interface);
- *Legal safety* (questions of liability and issues relating to traffic legislation).

In keeping with the findings currently available, this agreement deals primarily with the sphere of road safety, thereby also taking account of the priority that is attached to

road safety. In some spheres, further studies will have to be conducted to deepen knowledge.

It is the unanimous opinion of those involved that the following **basic requirements** regarding design and installation are **indispensable and that an international consensus can be reached on them:**

- All types of information and communications equipment in motor vehicles must be designed such that the driver is not forced or encouraged to use both hands simultaneously while driving to operate it, not even for brief moments.
- The use of all communications and information equipment that requires the driver to look at it must be minimised while the vehicle is in motion. This means primarily that while the vehicle is in motion, **functional** information may be provided, i.e. information that assists the driver in his immediate task of driving his vehicle (including finding his way and planning his journey) and serves the purposes of freight and fleet management, vehicle checks, automatic registration of charges and other tasks related to driving. Information that is likely to greatly distract the driver visually (for instance TV, video, commercials) must either be switched off completely while the vehicle is in motion or may be presented only in such a way that the driver cannot see it directly.
- The information system must not deactivate or interfere with existing control equipment and prescribed instruments, in particular those that are required for road safety and safety of operation and those that the driver requires to be able to drive his vehicle safely.
- The proper use of information systems in motor vehicles, as well as the total or partial failure of such systems, must not impair the safe operation of the vehicle.
- This means that the driver must at all times be able to perform by himself his primary task of driving his vehicle.
- The information system must not pose a danger to the passengers or other road users. This statement also applies to the foreseeable incorrect operation of the system by inexperienced users.
- In the case of speech-based communications systems that are designed to be used by the driver while the vehicle is in motion, provision must be made for hands-free speaking and listening equipment.

All those involved agree that in the development and employment of information and communications systems for road vehicles, it is **recommended that account be taken of the following requirements:**

- The mere presence of a system, and the functions of a system, should not result in any impairment of the functions of other systems in the vehicle or of the vehicle itself.
- Information systems should be easy to use.
- It should be possible to switch off the output of information by the system, in order to leave it to the driver whether or not he wishes to use the system.
- If the information system is designed for use by the front-seat passenger and the driver, it should be installed such that proper use by the passenger cannot have a negative effect on the driver.
- Visual information and communication should not be distributed over several display media if this could result in the driver having to divide his attention in the visual sphere, which would be detrimental to safety.

- The position of the information systems should be selected such that when the driver averts his eyes from the road ahead the movement of his eyes horizontally and vertically is as slight as possible, and that the systems are easy to read.
- The information system should be-designed such that it does not distract the driver excessively and could not potentially cause him to drive in a dangerous manner (for instance by overreacting).
- In order to ensure that it is used, the information system should not require the driver to reply or respond within a specific period of time. The driver must **be** able to determine the speed of interaction himself or to interrupt it. Nor must the attention that the driver requires for the primary task of driving his vehicle be diverted for any length of time.
- The information provided should, whenever practicable, assist the driver in a timely manner and in line with his requirements. Thus, for instance, routine information should be provided well in advance, to enable the driver to execute the necessary manoeuvre safely.
- Input by keyboard should be minimised while the vehicle is in motion or should be possible when the vehicle is stationary. Lengthy and repeated series of actions should be avoided. Controls should be limited to those that are absolutely necessary and designed such that they can largely be operated without looking (haptic aids).
- In order to minimise the amount of time during which the driver has to avert his eyes and to reduce the over-stimulation of his sense of vision, it is recommended that the acoustic information channel be used.
- Instructions regarding the information system, its installation and operation should be correct, adequate, simple and written in the language of the country concerned. They should be designed such that future users can also learn how to use the system (learning by using).
- The operating instructions should also highlight potential dangers and system constraints, and should point out that vehicle information systems may only be used in such a way that they do not constitute a safety hazard.

Those involved would like to see the guidelines agreed here made more precise through further research, the results of which could be contributed to ongoing standardisation activities at CEN and ISO level.

Netherlands

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1. National Policy framework

The traffic information chain (consisting of three major parts: collection - processing - distribution) is a chain, which requires the co-operation of the various players in this chain. The government plays a major role in the collection of information, the processing of up-to-date, reliable and consistent information and making it available; the involvement of the private sector is in offering the services, the distribution of information and the production and sales of user equipment; the consumer is the end-user.

The Ministry of Transport, Public Works and Water Management has opted where possible to shoulder responsibility for the collection and processing of data, both of which are at the base of the information chain, since it is in this way that it can keep a grip on matters relating to road safety, traffic flow and road management. Other types of services can give added value to the basic data. This added value would appear to be a condition for the successful operation of traveller information services by other providers.

Automatic collection and processing will produce better quality and more consistent basic data. By supplying these high-quality data to distributors free of charge, the Ministry is indirectly encouraging the launch of traveller information services to meet demand from an emerging market.

However, in supplying these basic data, the Ministry sets conditions. Distributors will be required to safeguard the quality, consistency and objectivity of the information they provide, while ensuring that it is up-to-date, does not endanger road safety, and is accessible to the public. All of these factors will be set down in agreements. After all, the Ministry cannot be held responsible for the information distributed by these parties.

The Ministry is opposed to one party monopolising the market for traveller information, since it believes that other parties can also provide useful contributions.

The Ministry is endeavouring to interest third parties in the operation of RDS-TMC, on either a commercial or non-commercial basis. As an incentive, it will provide a one-off financial contribution. The systems will be introduced by module, independent of location. The service must be available for different types of receiver and forms of presentation other than the spoken word must be possible.

The service must be sufficiently reliable and it is for this reason that the Ministry is endeavouring to produce better quality basic data. The service will only be available to travellers when the data have an acceptable quality.

The Ministry has also commissioned the development of a multimodal traveller information system, to be operated commercially. The system must provide travellers with objective information on the basis of which they can compare the pros and cons of transport modalities. Innovative distribution channels, coupled to booking and payment systems, are matters for the more distant future.

These services will be provided within a market in which complex forces are at work, and the operational base is narrow. The Ministry has therefore taken the initiative with the development of a strategic concept and the organisation of tendering procedures. It will also provide support in the form of one-off starter subsidies.

The distribution of information on public transport is essentially the responsibility of the operators themselves, who have now set up a joint Public Transport Information Service. The Ministry of Transport, Public Works and Water Management has provided financial support in setting up this service. In addition to a traveller information telephone line, the Information Service, working in consultation with the Ministry and other parties, is now developing other forms of distribution, such as information panels and a network version of the Public Transport trip planner.

Where distribution does not meet individual needs, in-car systems can fill the gaps. And because they can cut down the number of hours motorists lose on travel, these systems are vital. They form a new and powerful instrument in efforts to encourage travellers to choose flexible, multimodal transport routes, both on the motorway network and on the subsidiary and urban road networks.

The Ministry does not plan to introduce in-car systems itself. But it is in the Ministry's interests for cars to be equipped with them. Action is therefor called for if these systems are to be effectively implemented in the not-too-distant future. The Ministry therefore encourages and supports initiatives to develop in-car systems, particularly where organisational factors are concerned.

2. Legal framework

Currently there are no basic national and/or regional laws and regulations on advanced traffic information services. In order to guarantee the quality of continuing use of the basic traffic information, clients of National Traffic Information Centre (TIC) will have to comply with certain criteria. TIC concludes supply agreements with its clients in which these criteria are laid down.

3. Players in the information chain

Providing traffic information services, requires the combined efforts and close co-operation of the various organisations in the chain, which for the Netherlands are organised as follows:

- Government: Collecting traffic data;
- Government: Processing traffic data to produce up-to-date, reliable information and making it available;
- Private sector: Service provision and operation;

- Private sector: Distribution/broadcasting of information;
- Private sector: Production and retail of consumer orientated equipment;
- Consumer: End-User of the service.

Initially, the ‘processing’ within the TIC was defined as a Public Private Partnership. The technical development and operational organisation definition went very well. Commercial considerations made the private sector partner decide to take another position in the traffic service information chain as service provider. The established TIC organisation is now fully ‘public organised'.

4. Data collection and management

4.1. National and regional organisational framework

The Ministry of Transport, Public Works and Water Management, as the national road network manager, regards the collection of basic data on the road networks as its task. Improving the quality of traffic information entails improving the ways in which it is collected. It is for this reason that collection on the motorway network is being extensively automated. And this can be seen as a giant leap forward if we consider the methods now in use.

Provinces and municipalities are responsible for the collection of traffic data on their own roads. Currently, within and around cities, traffic control systems already collect these data.

The new generation of in-car systems could give a quality-impulse to traffic data and lead to great improvements in traveller information. These systems send relevant data (Floating Car Data) to the traffic control centres. The Ministry is now developing a multi-monitoring concept, combining roadside and in-vehicle collection.

Within the Netherlands it is the objective to have only one source for traffic information. This source will be the National Traffic Information Centre. This TIC produces from collected traffic data high quality and up-to-date traffic information and offers this to Value Added Service Providers (VASPs). This traffic information is defined as: "Information concerning the actual situation on the (Dutch) roads, as well as short-term forecasts regarding those situations which are of major concern to the (prospective) road users”. This information consists of the following elements: information on traffic flows, actual and planned roadworks, expected congestion, traffic-related weather forecasts, traffic-relevant information concerning public transport and parking problems, advice and announcements from the side of traffic management.

4.2. Service provider freedoms

Value Added Service Providers (VASPs) have to distribute traffic and travel information. VASPs can also provide it as part of their commercial service package. The Ministry of Transport, Public Works and Water Management feels that there is, in principle, a basis for the operation of traffic and travel information services, but it wishes to provide incentives rather than develop and operate them itself. Wherever possible, the Ministry will allow the market to play its own role, and it will encourage creative entrepreneurship. What this implies is organisation, co-operation and confidence.VASPs are the intermediaries between the national TIC and the road users. The TIC supplies basic information to VASPs. The VASPs enrich this basic traffic information with other data and/or edit it to such a degree that customers of the VASP recognise the extra value.

In order to guarantee the quality of continuing use of traffic information, VASPs of the TIC have to comply with certain criteria. These criteria are laid down in an agreement between the TIC and its clients and concern among other things the forward distribution of information.

VASPs are not allowed to alter the contents of the traffic information supplied by the TIC . They may, however, edit and aggregate the data, on condition that the criteria of selection are explained to clients. Offering the information as part of a wider package with different information, non-traffic information or traffic information on roads not included in the TIC-network is also allowed.

4.3. Handling of reliability issues

The organisation TIC-Nederland has defined a Quality and Quality Assurance plan and has a division directed towards this. Its primary task is the improvement of the quality of the basic traffic information. The division is particularly responsible for guaranteeing the quality of the collected information and for audits of the TIC-clients: the VASPs. The division also follows the market developments, not just the user/clients and offer/supply angle, but also available systems, methods and techniques.

In order to guarantee the chain quality of continuing use of the traffic information, clients of TIC will have to comply with certain quality criteria (see also ‘Service provider freedoms’).

4.4. Use of Standards (including de facto industrial standards)

The TIC provides information in coded form. The codes used refer to agreed common European standards:

- the RDS-TMC location database
- the DATEX Data Dictionary
- DATEX and DATEX-Net specifications

The RDS-TMC location database is maintained by Rijkswaterstaat. To this purpose, a management group has been formed which is responsible for keeping the database up-to-date and for coping with reported errors. Primary responsibility for the distribution of the location database rests with the Dutch RDS-TMC VASPs who provide the TIC-Nederland with the updates, after which TIC-Nederland takes care of the distribution among its clients. TIC-Nederland deals also with version/release related organisational issues.

The DATEX Data Dictionary is an English document. In order to avoid translation and interpretation problems, TIC-Nederland provides its clients with the Dutch translation of the current tables from the Data Dictionary. When new versions become available via TIC-Nederland, VASPs are obliged to implement the new version into the system which receives the data from the TIC and also ensure that their clients are also able to interpret the messages correctly.

DATEX and DATEX-Net are specified as the communication standard between the TIC and its clients. Only if considered necessary by TIC for the Dutch situation, options, corrections and additions to the DATEX specification will be presented.

5. Discussion

Due to the complexity of future traffic information services, inter agency co-operations and new organisational structures are needed. Until now traffic information was mainly disseminated by single organisations like the national motorway police agency and the Dutch automobile association.

Due to the complexity of services all kinds of new technological systems are under development. Besides these technological challenges new ways of policy, organisation and co-operation are also defined, implemented and evaluated. The combination of various skills and resources that are needed for the above mentioned requirements results in a total ‘value added service chain’. Such a chain consists of interdependent ‘links’ in which each link gives its specific contribution to the final (traffic information) product. These links in themselves can sometimes be regarded as a service of their own.

Different trends and facts give change to the existing situation:

- The services become too complex for one organisation; many require- expertise that is available mainly in the private sector,
- Services will become commercialised so that a good balance between cost and benefit can be achieved,
- Authorities will focus on their core activities and stimulate the private sector to introduce and provide these new services. This requires public private co-operation.

- Results from international research programmes such as DRIVE, IVHS and Prometheus, in which both the public and private sector have been involved, are now in a stage of being introduced commercially. This requires public private co-operation.
- With respect to safety it is preferable to have consistency in traffic information by co-operation instead of several inconsistent services in competition.

It is important to recognise the dependencies between the organisations in the chain:

- The position, role, responsibilities of all the organisations in the service chain need to be determined at the start or at a very early stage.
- New and complex services often require high initial investments and can involve potential risks. The risk can vary tremendously for each link in the total chain. Organisations in the chain do not like to accept the risk that 'the others' cannot fulfil their commitments (planning, required quality level, technical problems, etc.) In consequence mutual agreement and commitment between the players is a pre-requisite. The introduction of new services is often postponed for this reason with the parties waiting for each other to see which way the other one moves..
- Commercial considerations determine the negotiating position an organisation will adopt in the service chain.
- The operation of the service is heavily dependent on what industry players are planning to do with respect to their marketing strategy.
- Since the final service quality is determined by the weakest link in the chain service level agreements are needed.
- Organisational and technical interfaces need to be specified at an early stage.
- Good co-ordination between all the players in the service chain (especially during the development/realisation phase) is a pre-requisite.

6. Conclusions and Recommendations

Experience in the Netherlands of setting up a total traffic information service by means of a value added service chain showed that

- Strategic, political and commercial considerations determine heavily what kind of position organisations will hold in the chain.
- Participation of the private sector in a link of the service chain depends heavily on the added value and commercial viability of that link.
- New and complex services often require high initial investments and can involve large business risks. Organisations in the chain do not like to accept the risk that 'the others' may not be able to fulfil their commitments.

- Organisations which have major obligations to their members/customers (or governments who have adopted a policy or underpinning services) are forced to finance major parts of the service chain.
- The Netherlands as a small country has very little or no influence on the marketing policy of (electronic or automotive) industries.

A European strategy on ITS implementation and a breakthrough in Public-Private Co-operation is urgently needed.

7. Case study : 'RDS-TMC Traffic Information Chain in The Netherlands'History

7.1. Background

Distribution of road traffic information is one of the most effective measures to improve the utilisation of the existing infrastructure. Through this measure, better use can be made of the capacity of the network by supplying the road-user with reliable and timely information concerning amongst other things congestion, weather conditions and incidents.

Investigations have shown that traffic information can make a significant contribution towards reducing congestion problems. It was also indicated that with large scale distribution of traffic information the vehicle loss hours can be reduced by approximately 20% (on the motorway and subsidiary road network). It is expected that more than half of this reduction will be achieved by supplying the motorist with in-car road traffic information.

The Ministry of Transport, Public Works and Water Management (MoT) has the following intentions concerning in-car traffic information: The MoT will create the necessary conditions for national coverage of RDS-TMC to come into effect in 1998.

7.2. Goals

The Ministry of Transport, Public Works and Water Management (MoT) has the following policy concerning in-car traffic information:

The MoT will create the necessary conditions for nationwide coverage of RDS-TMC to come into effect in 1998.

The role of the MoT concerning activation of the market penetration of RDS-TMC has been further examined and specified. The MoT will, in combination with the private sector, accelerate the introduction of these information systems. MoT will put further emphasis on the creation of necessary conditions such as the availability of the traffic monitoring system and relevant standards.

The MoT, however, sees no role for itself in the actual operation of such systems as yet. Close co-operation between the government and other parties (Netherlands' National Police Agency (KLPD), Service Industry, Electronics Industry, etc.) is vital for the creation of road traffic information services and will be encouraged by the government.

7.3. Description

In order to implement the policy with respect to traffic information, the total chain of dynamic in-car traffic information service consisting of interdependent links needs to be organised and implemented. These links are

- traffic data collection,
- processing to produce up-to-date, reliable and consistent information,
- making this information available for the user,
- distribution via the various communication media,
- last but not least in the chain the traffic information consumer e.g. road user.
- Very important -but no link in the chain to get it in operation- is the production and retail of the (consumer oriented) equipment.

Providing traffic information services, requires the combined efforts of the various organisations in the chain, which for the Netherlands were intended to be organised as follows:

- Government: Collecting traffic data information
- Government and Private sector (via PPP): subsequent processing thereof to produce up-to-date, reliable data and making it available.
- Private sector: service operation and provision, distribution of information and production and retail of consumer orientated equipment.
- Consumer: end-user of the service.

To achieve this various projects within the chain were initiated:

- **Monitoring** project to collect the data on the total highway network
- **Traffic Information Centre (TIC)** project to process the data
- **TMC Implementation in the Netherlands (TIN)** project to distribute the data. In this project the private consortium **NIKITA** was the result of the tender
- **Realisation in Car (RIC)** project to stimulate industry to demonstrate and market their in-car terminals in the Netherlands

7.4. Lessons learned

7.4.1. Monitoring project

The monitoring project, although hampered by various technical and/or organisational problems, is well on its way to collect and provide in the near future traffic data of the total highway road network.

7.4.2. TIC

The objective is to achieve a high penetration of reliable and consistent traffic information. For this reason the policy was adopted to achieve one unique collection and processing organisation within the Netherlands. Among others for this reason the

TIC will provide its traffic information to all Service Providers for free (at cost price of supply).

Initially the TIC was defined as a Public Private Partnership with MoT, KLPD (both public) and ANWB (private) as partners. The technical development and operational organisation definition went very well. Commercial considerations made ANWB decide to take another position in the traffic service information chain as service provider.

The new established TIC organisation is fully 'public organised' so that from a juridical point of view all service providers can be equally treated. The TIC will be organised in such a way that the requirements regarding availability and quality of traffic information, stemming from the duties and responsibilities of KLPD and MoT, will be complied with. In order to guarantee the quality of continuing use of the basic traffic information, clients of TIC will have to comply with certain criteria. TIC concludes supply agreements with its clients in which these criteria are laid down.

7.4.3. TMC Implementation in the Netherlands (TIN) project and consortium NIKITA

The objective of TIN is to stimulate the private sector to distribute as service provider traffic information to the road users on basis of the RDS-TMC medium.

In the past RDS-TMC has been tested by the Rijn-Corridor partners in the Netherlands. It was expected that this or another consortium could give a follow-up for the real implementation and in the long term independent exploitation of RDS-TMC in the Netherlands.

After investigation it appeared that no consortium could be formed to exploit RDS-TMC on a commercial basis. None of them wanted to take the risk despite their involvement and knowledge of the subject. The risk and the unknown factors seemed to be too big. The commercial possibilities of RDS-TMC were not expected to be realistic by those parties and currently there is no market potential except for the RDS-TMC terminals (if service is in the air).

Comparable to other countries, MoT has at political level proclaimed RDS-TMC to be a public and collective service of strategic importance. It is foreseen as a basic service for free. It is for this reason that MoT has taken responsibility for the realisation of nationwide coverage by the RDS-TMC service. MoT has awarded a contract to the Nikita Consortium for the implementation and exploitation of the RDS-TMC services. The subject of the contract is the full implementation of the system as well as its exploitation for three years. All activities are fully financed.

The disadvantage of this approach is that the selected consortium might see this as a normal order and that after three years no (commercial and independent private) follow-up is guaranteed.

7.4.4. Realisation in Car (RIC)

The RIC-project's objective is the accelerated introduction of these information systems. RIC focuses on the implementation of safe and effective in-car equipment. RIC is concentrating on RDS-TMC equipment that will present the motorist with information in graphical form.

RIC investigated in Europe, USA and Japan the availability of RDS-TMC in-car equipment with a graphical presentation of traffic information suitable for a test. RIC identified industrial organisations who are willing as co-operating partners of MoT to introduce in-car terminal equipment on a risk-bearing basis. This as predecessor to the real commercial introduction of this service and equipment. The operation of the service (a.o. in-car terminals) is heavily dependent on what the electronic supplier industry are planning to do with respect to their marketing strategy. It is obvious that The Netherlands as a small country has very little to no influence on the marketing policy of these industries. MoT has been encouraging European industry to deliver their products in synchronisation with the EuroDelta programme. Unfortunately it is now evident that this plan is not realistic.

Important is an European strategy on ITS implementation and a breakthrough in public-private co-operation is urgently needed.

7.5. Summary information for DUTCH 'RDS-TMC' service (Netherlands)

DUTCH 'RDS-TMC service page 1	Main players in the information chain and the principal contractual arrangements in place
1. Geographical region covered by the service	Initially EuroDelta test-site and extending to total highway network of NL
2. Relevant authorities	Ministry of Transport, Public Works & Water management
3. Infrastructure Owners	Ministry of Transport, Public Works & Water management
4. Public sector data owners and providers	Ministry of Transport, Public Works & Water management Dutch National Highway Police (KLPD)
5. Private sector data owners and providers	ANWB, meteorological organisations
6. Service operator	NIKITA Consortium
7. Information editors and service database managers	Information editors: national Traffic Information Centre service database managers: NIKITA
8. Communications providers	FM-radio broadcasters Nozema
9. Service provider to the end users (marketing, billing, etc.)	NIKITA
10. End users: main groups / categories	Pre-trip home/office and on-trip in-car RDS-TMC users

DUTCH 'RDS-TMC service page 2	Service Delivery Details
11. Description of service content	Conforms to RDS-TMC service description
12. Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	Real-time and predictive highway network traffic data
13. Transmission media used	FM radio sub carriers
14. Market segments targeted	In-vehicle users
15. Service pricing policy	Policy is to make RDS-TMC a free service
16. Strategic marketing partnerships	
17. Nature of any Public / Private partnership	PPP has not succeeded; NIKITA is funded by the Ministry of Transport, Public Works & Water management
18. Main revenue streams	First three years none; subsequent plans not known?

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1. UK POLICY

1.1 General Policy Framework

The approach taken by the UK Government and its Agencies in respect of transport information using transport telematics is essentially permissive. This means that the primary purpose of the main legislation is enabling rather than controlling; encouraging rather than restrictive.

Although the UK has seen a new government in 1997 the basic approach on this subject is not expected to change and is manifested in local and central government and their Agents by providing roadside information and working in partnership with the private sector to provide added value information services.

1.1.1 Roads Authorities

Strategic roads (Trunk Roads and Motorways) are owned and controlled by central government. Apart from in Northern Ireland all other roads are controlled by local highway authorities. A large amount of traffic data is collected and processed by central government or its Agencies but, apart from Scotland, relatively little use is made of the data in relation to real time information for travellers.

This situation is likely to change within the next few years as the RDS-TMC demonstration project goes live and Regional Traffic Control Centres are established.

1.1.2 City, Regional and National Authorities

The role of National Authorities has been noted in 1.1.1above, Regional Authorities are currently restricted to Scotland, Wales and Northern Ireland. Scotland and Wales have taken a pro-active role in developing telematics systems, generally on a partnership basis with the private sector. Scotland and Northern Ireland have separate legislative frameworks from the rest of the United Kingdom and therefore any legislation must specifically or separately deal with those areas if it is to apply. Regional Government does not yet apply to England.

Local (City and County) authorities have been active in telematics demonstration projects but no full commercial or public service covering these areas have yet been provided.

1.1.3 Collective Transport Operators

Following deregulation of bus operations and privatisation of the railways there has been limited scope in the UK for the provision of comprehensive collective transport information. The exception has been in major conurbations surrounding cities like London, Birmingham, Leeds, Liverpool etc., where a Passenger Transport Authority exists which can provide a central focus in such areas as information. This is usually provided via personal enquiry, telephone call or occasionally an information point screen. The information is generally confined to off-line data such as timetables, fares,

etc., although some real-time information services have progressed beyond the demonstration phase. Notable examples are London Underground trains and buses in Southampton where the next vehicle arrival time and destination is displayed.

1.1.4 Police

The function of the police in the UK in relation to road traffic is to control, to deal with incidents and to stop infringements of the law. Providing information on congestion, accidents, etc., is very much a secondary consideration but is sometimes done if the control function is made easier by broadcasting the information. Basically the police have no specific duty to provide traffic information to the public, but may do so in discharging the functions mentioned.

1.1.5 Automobile Clubs

Historically the automobile clubs have been providers of information, primarily to their members but also to the general public. As early as 1900 the automobile clubs were warning their members of the existence of police speed controls. The provision of static information on suitable routes, roadworks, etc. has been an important service. Real time information is increasingly important and the principal organisations concerned are actively seeking a major role, usually in partnership with public sector agencies, in the provision of information services. Since approximately half of all car drivers are members of one of the two principal organisations, a high proportion of drivers are potentially involved.

1.1.6 Broadcasters

Both public and independent broadcasters provide traffic and travel information. The information usually concerns the main roads and although not generally real time is usually reasonably up to date. However there have been a number of well documented examples of information not being accurate because of the delay in a broadcast. Information provided also tends to be selective depending on the time available to broadcast and the information supplied to the broadcaster. No independent checking of data is undertaken.

The exception to this is the provision of information live from a radio journalist in a helicopter or light plane flying over the city. A number of major cities have this service which is broadcast on local radio stations and is particularly directed towards peak hour commuters.

1.1.7 Telecommunications Providers

Telecoms agencies have so far not been involved in the data collection, processing or publishing stages of transport information services. They are simply providers of data transmission facilities, usually by radio or hard wired systems. Demonstration projects are often undertaken without charge to the user, but for all commercial or public services transmission costs are charged.

1.2 Roles and Responsibilities in Road Transport Telematics

1.2.1 General

There is still a degree of uncertainty in the role of information in respect of control and management of road traffic in the UK. It is recognised that timely, accurate, information has an effect on the decision to travel, by what mode, to what destination and by what route. The uncertainty lies in the amount of influence information can have and whether its provision should be part of the traffic demand management process or kept as a separate service.

1.2.2 National Government

Government has taken, and continues to take, the view that beyond roadside information services should not be its responsibility but rather that of collective transport operators or private information publishers. Hence Government has adopted a supportive and facilitory role rather than a controlling or restrictive approach. The primary legislation is the Road Traffic (Driver Licensing and Information Systems) Act 1989. The Act is essentially enabling and requires a dynamic information system to be licensed. The Act empowers the Government to limit by Order the types of dynamic information systems that require a licence. To be dynamic a system must collect data information from vehicles and provide guidance on alternative routes which takes account of current traffic conditions. Consequently an electronic gazetteer which only indicates alternative routes without giving traffic conditions on the alternative does not require a licence. At present only one licensed system is functioning in the UK.

Central Government will be involved in the proposed provision of Regional Traffic Control Centres. These will utilise data collected for control and management purposes as well as for onward transmission to travellers, is seen as a public/private partnership. The scope of such partnerships and the mechanics of their establishment is still under discussion. Thus there is at present no formal framework or pricing structure for information publishers to obtain publicly collected data for processing and onward transmission, but a lot is happening without this.

1.2.3 Non-Governmental Agencies

The role of non-governmental organisations is still developing but as can be seen from earlier sections, private contractors, motoring organisations broadcasters, telecommunication providers and vehicle manufacturers are all active in the field. Their particular roles and responsibilities are emerging as the commercial market becomes more mature and will become defined over time.

1.2.4 Allocation of Responsibilities

It can be deduced from the discussion on national policy, the current situation is that the responsibility for data content and accuracy lies totally with the information publisher. The Government takes the view that it has no liability for information outside existing legislation, whether it is supplied by itself to a publisher or an end user.

The private sector providers currently operating in the field acknowledge that they may have some exposure for consequential damages as a result of inaccurate information. However they believe the risk is very small and they are able to insure against any liability. This situation is likely to remain unless and until successfully challenged by civil litigation.

1.3 Data Management

1.3.1 Data Collection

Large amounts of data on traffic conditions are collected by national and local government agencies. Much of it is dynamic in origin but is only used dynamically to a limited extent, primarily in incident detection for motorways. Historical data is sold on for various reasons, primarily to enable the impact of new development to be assessed. No nationally agreed charging structure has been developed. Private firms operating in the information field currently collect or intend to collect their own data and thus control all stages in the information chain.

1.3.2 Data Processing

The same general observations apply to data processing as to collection, with the private operators creating added value through processing.

1.3.3 Publishing

In the UK, transport information publishers have freedom of operation and control is exercised through general Consumer Protection, Health and Safety and Data Protection legislation. This approach is currently deemed to provide adequate safeguards for the end user including that of privacy, but it must be stressed that there is always a degree of uncertainty in such situations in that it has not been tested in the courts.

2. DISCUSSION

2.1 Promotion of Services

For some time there has been a recognition at both central and local government levels that transport information has a significant role in encouraging safe, efficient and environmentally sustainable transport including the management of congestion. However the scarcity of public funds has meant that financing has been restricted to demonstration projects and unless highly cost effective in support of public policy issues, services will have to be commercial.

A variety of systems are being encouraged in the UK on the basis that competition will deliver the most economic and efficient service. It remains to be seen whether circumstances generate what amounts to a virtual monopoly, which is what has happened in some areas in the collective transport sector following deregulation. With the limited experience available in the UK there appears to be a measure of competition but because of the high start-up costs and uncertainty about the costs and impact the effect is limited.

What appears to be an emerging trend is for particular information providers to target a specific market segment e.g. trucks, vehicle theft, etc. and concentrate on selling to that sector.

Public sector revenue streams have not yet developed, partly because the market value of basic information has not been determined. Current providers have avoided using publicly available or provided data.

No specific encouragement in the form of public funding of traffic information services has been undertaken. However (a few) individual local authorities have seen the benefits and are enthusiastically promoting services at that level.

The quality and accuracy of transport information in the UK is the responsibility of the publisher and protection to the end user is provided through legislation designed to protect the purchaser of goods and services. The supplier is required to ensure that such goods and services are fit for the purpose they were intended for. The service provider cannot issue disclaimers which reduce the end user or customer's rights in law.

2.2 Commercial Services

No special regulations exist to control commercial services other than those that fall within the scope of the 1989 Act. Therefore, there are no rules on the resale of free information and publishers are expected to make their own arrangements to protect their commercial and operational confidentiality and intellectual property rights.

2.3 Public/Private Partnerships

The current basis for establishing public/private partnerships is that of a combination of quality of service and price. This is not expected to change.

Each partnership is undertaken within the framework of an agreement but these agreements are generally formulated on the basis of protecting each partner in a legal and commercial context. Partnership agreements normally cover objectives, allocation of risk, costs and benefits to each party. Transport information poses no particular problems or conditions.

A very promising approach has been set up in Scotland by the SCOTIA (SCOttish Traffic Information Association) initiative which provides its members with access to real-time traffic and travel data. SCOTIA, lead by the Automobile Association (AA), brings together private motoring and transport companies and associations with local, regional and national governments. The SCOTIA consortium will operate a Traffic Information Centre in parallel with national and regional traffic management operations provided by the public sector. SCOTIA offers three membership classes with different annual contributions:

- *base partners:* those wanting to keep a watching brief, to lend nominal support, provide expertise and protect their interests (£1,000 per year);
- *users or local government:* private or local government bodies that expect to use TIC data and SCOTIA software for their own internal uses only (£2,500 per year);
- *telematics companies/central government:* private companies planning to use TIC data and SCOTIA software to gain experience in transport telematics and develop products and services (£20,000 per year).

2.4 Legal and Liability Issues

2.4.1 Legal

Control of the traffic information supply process in the UK is currently limited to the Road Traffic (Driver Licensing and Information Systems) Act 1989 under which a licence can be granted to system operators. The purpose of the Act is to enable system operators to install apparatus in the highway and to ensure that new systems do not prejudice road safety or good traffic management. Protection of the end user is covered by various legislation dealing with vehicle construction and use, consumer protection, health and safety, traffic and data protection. Current legislation in these areas is likely to provide for most future situations except in very specific instances.

2.4.2 System Accuracy

Responsibility for accuracy is deemed to rest with the publisher of information and similar requirements apply as described above.

2.4.3 System Safety and HMI/Issues

Safety issues are of prime concern to UK transport agencies and considerable effort is being devoted to them. The issues fall into two broad areas; firstly the inherent safety of the systems which are directly related to such concerns as equipment reliability, and the way such systems are used by drivers.

The British Standards Institution published a Draft for Development in 1996 called a "Guide to in-vehicle information systems". This covers safety issues which should be addressed by manufacturers, suppliers and installers of in-vehicle systems. It also briefly covers the responsibilities of the driver. The Government has commissioned the development of a checklist for applying the guidance to individual systems.

Further research is planned to investigate the safety aspects of multiple information systems in vehicles.

The responsibilities of the driver are broadly covered by the Highway Code, a new version of which is under preparation. Advice on the use of in-vehicle information systems and other equipment is still being considered.

2.5 Use of Standards

UK Government has strongly promoted the use of relevant European or international Standards e.g. DATEX

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Successes and Failures

The provision of transport information in the UK has had mixed success. Dynamic driver information will be available as a commercial service covering 15,000 km of strategic road network by the end of 1998. At least two other systems based on satellite technology are being promoted. All these operators are intending to (or already do) operate outside the UK.

Collective transport information services and integrated systems are less well developed. Bus based information tends to be localised and although in theory rail systems are national, significant problems exist on effectiveness of the call-in process and the accuracy of information. With the current Government approach there are very few obstacles to the introduction of new system providers. The key inhibitors are the assumed high start-up costs which tends to restrict new entrants to major commercial consortia.

The provision of traffic information in the UK has tended to be vertically integrated because the supplier has control over all stages of the information chain, thus making him independent of external influences. This may change with the proposed introduction of Regional Traffic Control Centres when revenue to support such centres could be generated from the sale of on-line data.

3.2 Recommendations on Good Practice and Policy

For the UK Government the key concerns are related to safety issues and ensuring that good traffic management and control strategies are not compromised. Current policy tends to be one of encouraging the safe development and commercial use of systems.

Positive guidelines on safety have been published and are being refined in conjunction with the EC and other members states..

UK Consumers of goods and services are protected under a variety of legislation and current thinking tends to the view that this will adequately cover the provision of transport information.

Minimum restrictions are placed on the freedoms of service providers to deliver information. Particular areas which are controlled are:-

- the use of broadcast information over radio frequencies which require a separate licence for each service on a dedicated frequency; and
- the use of alternative traffic routes which may be unsuitable for certain types of traffic e.g. the use of minor residential roads. This is of potential concern to local highway authorities, but at present can be controlled by the 1989 Act.

The problem of local alternative routes identified above could be a contentious issue. The application of the 1989 Road Traffic Act may provide inadequate protection and additional arrangements may have to be introduced.

3.3 Integration With Traffic Control Operations

At present there is limited integration of traffic information with traffic control operations, although the introduction of Regional Traffic Control Centres will provide an opportunity to do more.

A significant concern exists on the provision of transport information in local urban areas such as cities or conurbations. In these situations information on road conditions and collective transport alternatives must be integrated if control strategies are to be effective. At present there is no indication that private operators are keen to enter the market and the initiative continues to come from the public sector. Private participation will only occur if a satisfactory revenue stream can be established.

The provision of integrated information for urban areas is arguably more important than for inter-urban routes but, apart from London, is receiving significantly less attention. It is unlikely that this situation will change until additional funding is made available and/or congestion becomes so bad that something has to be done.

Considerable experience is available on public/private partnerships which are intended to deliver services to an end user. It is not anticipated that traffic information service provision will, in essence, be significantly different.

4. UK LICENSING

4.1 ROAD TRAFFIC (DRIVER LICENSING AND INFORMATION SYSTEMS) ACT 1989

4.1.1 National Objectives

The Road Traffic (Driver Licensing and Information Systems) Act 1989 is the principal legislative procedure whereby traffic information providers are permitted to offer services. It is essentially permissive legislation with terms and conditions designed to ensure that safety (for operator, driver, equipment installer) is specified.

4.1.2 Terms and conditions of UK Licence

I. Any data collected as part of the system and any records of the constituent hardware and communications links can be requested by government. Records must be kept for two years.

II. Government may make us of data or information obtained from the service provider but can only sell data if it is more than three months old.

III. The service provider can only use data such as number plate information for determining the time taken for a vehicle to pass from one recorder station to another. The information must be destroyed immediately after analysis. No disclosure to another organisation or individual is permitted.

IV. The equipment must be installed, maintained and repaired in a safe manner according to a number of other specified Acts or Manuals.

V. The actual method of installation of equipment is prescribed to the extent that the safety of the installers and road users is ensured as far as practicable.

VI. In the event of an emergency the Government may remove equipment.

VII. For guidance systems the Government may require the information published to identify which alternative routes are to be specified.

VIII. The licence holder must indemnify the Government against all claims that might be made, including losses, damages, costs and expenses.

4.1.3 Definitions from the Act

Section 8 of the 1989 Act defines a **driver information system as:**

"(a) a system for the collection, storage and processing of data from which driver information is derived; or
(b) a system for the transmission of data from which driver information is derived, by means of apparatus situated otherwise than in motor vehicles to motor vehicles equipped to receive the transmissions, or

(c) a system for both of the above,

but data is not "collected" unless it is collected from motor vehicles whether or not also from other sources".

Driver information itself is defined as:

"information (including guidance and warnings) of use to the drivers of motor vehicles relating to routes for or the position of their vehicles or traffic conditions and "route guidance" is to be construed accordingly".

Data is defined as:

"information recorded in a form in ' which it can be processed by equipment operating automatically in response to instructions given for that purpose".

5. CASE STUDY: ORCHID

Orchid is a real time information system developed by Global, Telematics Plc, which is a joint venture between European Telecom and Racal. In 1986 Racal introduced DGPS, with Orchid launched in 1997.

The basic system utilises GSM/GPS with SMS (Short Message Service) using voice communication only as the in vehicle service. This is done for safety reasons. SMS is a mobile originating/mobile terminating service which can carry up to 160 characters per message.

The ultimate system will provide vehicle tracking, navigational guidance, real time traffic updates, remote vehicle diagnostics, authorised immobilisation, on-line information services, roadside assistance and emergency service aft call out.

The current service comprises vehicle tracking and in-car navigation. The service is provided by the AA Roadwatch system and Orchid subscribers must be members of the AA, although the agreement is non-exclusive and it is intended to apply to other systems such as the RAC Carin service. The intention is that all in-car information will be provided via voice connection only using hands free cellular phone with a four digit dial-up number. This is done for safety reasons.

At the present time a vehicle tracking service is offered, but not vehicle security. This means that if the vehicle is stolen the subscriber is advised of its location and has to inform the police. UK Home Office regulations prohibit a service provider informing the police. This applies to any emergency service.

Fleet services are sold on a stand-alone basis and include vehicle tracking, security, location, route finding (Orchids own software), vehicle condition monitoring (e.g. refrigeration units, geofencing, etc.

Road condition information will be developed using floating car data (FCD) to provide real time calibration of historical traffic models. The system will require 10,000 subscribers to become fully operational together with a historical database/traffic model. No steps have so far been taken to obtain the historical data from public authority sources. The same approach will be used to provide short-term predictive traffic information. Orchid aims to have this service available by the end of 1999.

At present Global Telematics plc are considering whether the route information element of ORCHID needs to be licensed under the UK 1989 Road Traffic (Driver Licensing and Information Systems) Act.

5.1 Summary information for ORCHID Service (Great Britain)

ORCHID service: page 1	Main players in the information chain and the principal contractual arrangements in place
1. Geographical region covered by the service	UK 1997 SOUTH AFRICA 1998 Pan - European 1999
2. Relevant authorities	GLOBAL TELEMATICS PLC.
3. Infrastructure Owners	Not Applicable
4. Public sector data owners and providers	No Highway Infrastructure Owner Involved. Racal Landstar Satellite.
5. Private sector data owners and providers	None
6. Service operator	AA ROADWATCH - Navigation System. GLOBAL TELEMATICS - Tracking System.
7. Information editors and service database managers	AA Roadwatch
8. Communications providers	GSM. CELLULAR TELEPHONE - Currently Vodaphone
9. Service provider to the end users (marketing, billing, etc.)	Global telematics
10. End users: main groups / categories	Short Term - Corporate - Fleet Users Longer Term (by end 1999) - Individual Drivers

ORCHID service: page 2	Service Delivery Details
11. Description of service content	GPS/GSM vehicle location using SMS and digital mapping. Route finding / navigation via AA Roadwatch.
12. Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	1. Real Time - Tracking, route finding, navigation, 2. Predictive - Eventually using historical data calibrated by FCD**.** 3. Same as 2. 4. Parking data.
13. Transmission media used	GSM/SMS
14. Market segments targeted	See end users
15. Service pricing policy	Vehicle Units £700 -900 + extras, £150 installation. Vehicle fleet monitoring £5000. Digital mapping £1000. SMS Location 10p per message GSM - 98p per minute
16. Strategic marketing partnerships	AA Roadwatch) Vodaphone) NAVTECH) All non-exclusive. Lucas Kienzle)
17. Nature of any Public / Private partnership	Not applicable
18. Main revenue streams	Cellular phone

6. CASE STUDY: TRAFFIC*MASTER*

6.1 History

Trafficmaster was promoted by the private sector company General Logistics plc under the provisions of the UK's 1989 legislation on driver information systems.

A pilot licence was granted by DOT in 1989 covering M25 (London orbital motorway); a full 15 year commercial licence granted for England 1991; separate licences awarded for Wales and Scotland.

Commercial services began in September 1990 covering motorways within a 35 mile radius of central London. Phase 2 (Spring 1992) covered motorways in Southern England. Phase 3 (Spring 1993) extended coverage to motorways in Northern England and Scotland.

National coverage of motorways achieved by 1993; network extended to cover 500 miles of trunk roads 1996. Further expansion to 95% of England's trunk roads by 1998 (see map).

6.2 Goals

- To develop a fully commercial, profitable real-time traffic information service covering motorways and trunk roads in Great Britain.
- To develop a product range in real-time traffic information services and develop a UK market for these services.
- From 1996: - to expand into the mass market and supply original car manufacturer's equipment.
- From 1997: to expand coverage into Germany, France and the Netherlands and develop a European market with local partners. A 12 year licence agreement with Mannesmann Autocom was signed in April 1997. Other local partners are being sought.

6.3 Technical description

Trafficmaster uses paging technology and low-power radio transmitters to deliver encrypted real-time information on traffic speeds and congestion to its subscribers.

Spot speeds are collected automatically on motorways through a network of speed detectors mounted above the roadway on gantries and over-bridges at approximately 2-mile intervals.

Passive Target Flow Measurement based on image processing of car number-plates used for monitoring point-to-point journey times on trunk roads. Registration details are automatically encoded by software to ensure that personal information is not able to be viewed by operators.

Two types of in-vehicle unit are currently marketed: a graphical display and a synthesised voice-based unit. Trafficmaster is also available over the Internet (via the Vauxhall GM site) and by broadcast radio signal decoder to a PC.

“Freeway” (voice only) and “Trafficmaster YQ” (map display) are respectively entry-level and advanced products for the retro-fit market. YQ is packaged with optional message paging service.

Similar products are being offered as car manufacturers’ original equipment in a variety of packages, notably for the BMW 700 series and for GM Vauxhall mid-range.

Trafficmaster is developing low-cost receiver units for use with the cellular telephone market to warn of the existence locally of motorway congestion. Detailed information will be available by mobile telephone.

The technology allows re-setting of the Oracle in-vehicle units remotely when subscription renewal is required. The YQ unit needs a smart card key.

6.4 Non-technical description

General Logistics plc was a small venture capital business aiming at a mass market for driver information.

Company changed its name in 1994 to Trafficmaster plc and is now a public corporation quoted on the London stock market with a market value of UK £100m. ($150m)

6.5 Lessons learned

6.5.1 :costs acceptance and budgetary constraints

Trafficmaster has worked to develop a revenue stream from the beginning of commercial operations. Company turnover in 1996 was almost £4.5 million

There has been one rights issues to raise capital for network expansion.

Revenues have been slow until the last quarter of 1996 when sales of Oracle through Vauxhall /GM began.

Trafficmaster will be profitable in 1997, 3 years after floatation.

6.5.2 technical matters

Simple technology can be developed to deliver a sophisticated service, and a range of product options. Key points are the reliability and accuracy of traffic monitoring in space (percentage of the network) and time (24 hours continuous).

6.5.3 legislation

Trafficmaster is required to secure a licence because of the need to install traffic monitoring equipment on or adjacent to the roadway.

6.5.4 the people

The Chief Executive for Trafficmaster plc has been the driving force behind Trafficmaster from the outset and is a major share-holder. His enthusiasm and political skills have carried the project through to overcome the many technical, financial, organisational and bureaucratic obstacles to success.

6.5.5 organizational and institutional matters

Trafficmaster has formed a great number of business alliances in addition to working closely with the public sector authorities.

6.6 Sequential steps:

- General Logistics plc worked closely with the DOT and TRL during the pilot phase and subsequently to establish operational arrangements and the safety of the driver interface for in-vehicle equipment.
- Trafficmaster is licensed under the Road Traffic (Driver Licensing and Information Systems) Act of 1989.
- Government policy has been to encourage private sector initiatives in the development of Intelligent Transport Systems.
- Technology originally tested as THOMAS (Traffic Hold-ups on Motorways Alert System). Subsequent research into the Passive Target Flow Measurement to achieve accuracy and to protect driver privacy.
- Carried out by the company during 1988 & 89
- M25 London Orbital, September 1990
- Spring 1993 across Great Britain. Mainland Europe coverage begins in Germany 1997.
- An excellent example of the market driven approach to ITS by an Independent Service Provider, orientated to product development.

6.7 Summary information for TrafficMaster plc service (Great Britain)

Traffic Master plc service: page 1	Main players in the information chain and the principal contractual arrangements in place
1. Geographical region covered by the service	Great Britain (England, Scotland and Wales)
2. Relevant authorities	1. Department of Environment, Transport and the Regions, Highways Agency. 2. Scottish Office, Welsh Office. 3. Local Authorities who are motorway owners.
3. Infrastructure Owners	As 2 above.
4. Public sector data owners and providers	As 2 above, but not relevant to this service.
5. Private sector data owners and providers	Trafficmaster plc
6. Service operator	Trafficmaster plc.
7. Information editors and service database managers	Trafficmaster plc.
8. Communications providers	a) Data to Control - Vodaphone (PAKNET) b) Control to User - Radiopaging (Vodaphone) c) UHF radio beacons
9. Service provider to the end users (marketing, billing, etc.)	Trafficmaster plc
10. End users: main groups / categories	*a) Individuals* - Vehicle drivers, in vehicle (audio and visual); desk-mounted. Original Equipment for Car Manufacturers (Vauxhall/GM and BMW) Mobile phone *b)Group Access* - PC, TV monitor, Internet, Hotels, Police, Heathrow Airport, distribution centres

Traffic Master plc service: page 2	Service Delivery Details
11. Description of service content	• Trafficmaster uses paging technology and low-power radio transmitters to deliver encrypted real-time information on traffic speeds and congestion to its subscribers. • Spot speeds are collected automatically on motorways through a network of speed detector mounted above the roadway on gantries and over-bridges at approximately 2-.mile intervals. • Congestion is registered when speed fall below 30mph. Indication is provided in 5mph speed bands to zero. • Overhead detectors are have low-power radio transmitters augmented by roadside beacons at motorway junctions. • Passive Target Flow Measurement based on image processing of part of car number-plates used for monitoring point-to-point journey times on trunk roads. Cameras mounted on columns. • Two types of in-vehicle units are currently marketed : a geographical display and a synthesised voice-based unit. Trafficmaster is also available over the Internet (via the Vauxhall GM site) and by broadcast radio signal decoder to a PC. • 'Freeway' (voice only) and 'Trafficmaster YQ' (map display) are respectively entry-level and advanced products for the retro-fit market. YQ is packaged with optional message paging service. • Similar products are being offered as car manufacturers' original equipment in a variety of packages, notably for the BMW 700 series and the GM Vauxhall mid-range. • Trafficmaster is developing low-cost receiver units for use with cellular telephone market to warn of the existence locally of motorway congestion. Detailed information will be available by mobile telephone using a simple entry code. • The technology allows re-setting of the Oracle in-vehicle units remotely when subscription renewal is required. The YQ unit needs a smart card key
12. Description of main data categories collected: • **real-time/** • **predictive** • **network performance** • **Trip end**	Real time speed at approximately 2km intervals on motorway links. Real time speeds on Trunk Roads obtained from cameras at approximately 6km intervals
13. Transmission media used	a) Data to Control Radio packet data network b) Control to User UHF radio paging and radio beacons 449mHz
14. Market segments targeted	Vehicle drivers, Residents , Hotel Chains, Motor Manufacturers.
15. Service pricing policy	Initial purchase price for unit, Annual service subscription, Premium rate phone.
16. Strategic marketing partnerships	Mannesmann in Germany. Vauxhall in UK
17. Nature of any Public / Private partnership	No partnerships with public sector. Company operates under licence from Government using Road Traffic; (Driver Licensing and Information Systems) Act of 1989.

18. Main revenue streams	Currently annual service subscription. Will also be premium rate phone calls.

7. Case Study: Autoguide

7.1 History

- Autoguide was promoted in 1987 / 88 by the UK government (DOT) as "A better way to go" in congested urban traffic.
- DOT support was based on positive results of research on dynamic route guidance. The Transport Research Laboratory (TRL) estimated economic benefits c. £125m . (c. $200m) per annum based on 400,000 users, reduced journey times of 10% and reduced mileage of 6%. (1988)
- Special legislation was passed by the UK Parliament in anticipation.
- A 3 year pilot scheme for Greater London was the subject of a request for proposals in 1989.

7.2 Goals

- To demonstrate Autoguide to the public and to key decision-makers.
- To gain experience of the Autoguide technology.
- To gain experience of public / private partnerships and the ways that companies and organisations can work together.

7.3 Technical description

- Autoguide was a dynamic (traffic responsive in real time) route guidance system using infra-red beacons for two-way communications.
- Beacons conformed to a draft Anglo-German standard (LISB/Ali-Scout).
- Vehicles acted as traffic probes reporting link journey times.
- The pilot was planned to cover at least 60 km^2, (23 sq. mi.) with at least 200 beacons located at key junctions.
- The pilot network included all levels of the road hierarchy - Motorways to minor roads - and at least 3,000 separate road links .
- Computation of optimum routes was to be by centralised computer which would have links to the UTC system (partly SCOOT).
- The in-vehicle units would relay route selections with positive (turn-by-turn) route guidance. Route selections could be up-dated mid-journey.
- Advice to the driver was given when and where to turn both by voice and through a display fitted to the dash-board.

7.4 Non-technical description

- Promoters of Autoguide were solicited against DOT guidelines following extensive consultation with the industry over 2-3 years.

- Two potential promoters were short-listed. GEC Marconi Ltd was selected after independent evaluation of the technical and business case.
- Negotiations were protracted and covered all aspects of the pilot scheme.
- The promoter was anxious to reduce the risks in moving to a fully commercial system. Government saw the London Autoguide pilot demonstration as the pre-cursor to commercial operation.
- The local authorities in London were concerned about Autoguide directing users onto unsuitable roads, especially heavy lorries.

7.5 Lessons learned

7.5.1 costs acceptance and budgetary constraints

- Capital costs were high and the scheme envisaged private finance with no grant or subsidy from the public sector.
- Risks (technical, market and regulatory) in the last analysis were judged too high by the commercial partner.

7.5.2 technical matters

- The Autoguide licence was locked into infra-red beacon technology. A more flexible approach would have licensed the operation of a service independent of the technology.

7.5.3 legislation

- The 1989 Driver Information Systems Act was promoted by UK government to provide a legal framework for Autoguide.
- Legislation currently regulates only ATIS services offering dynamic (traffic responsive) guidance on driving routes or collection of traffic data from vehicles (see annex) .

7.5.4 the people

- A central plank in the UK government's strategy was a commitment to make a report to Parliament on the findings of the pilot and allow debate before confirming a fully commercial licence.
- This commitment, necessary politically, created an unacceptable level of uncertainty for the promoter who wanted objective pass/fail criteria.
- Preferred consortium led by GEC Marconi found the business case was not strong enough to go ahead with a privately financed pilot project in an unproven market.

7.5.5 organisational and institutional matters

- Protracted negotiations were drawn to a close after almost 2 years. DOT left the door open for later proposals on dynamic route guidance. None has been

offered. DOT was constrained in the degree to which it could be flexible in order to reach an accommodation with the promoters. In particular it could not offer long term exclusivity.

7.6 Sequential steps:

7.6.1 forming consortia among public, private, and academic sectors

- Consortia bid against official guidelines for the pilot issued by the DOT in January 1989. DOT nominated an independent monitoring and evaluation team.

7.6.2 enabling legislation

- The enabling legislation was passed by Parliament in 1989.

7.6.3 ITS strategic plan(s) at the national and local level(s)

- Policy on Autoguide was developed by DOT in 3 stages over 3 years: 1986: Discussion document; 1988: Pilot Stage proposals; 1989: legislation and official guidelines.

7.6.4 research and development

- Conducted over 10 years prior to the pilot proposals.

7.6.4.1 operational field tests

- LISB (Berlin Ali Scout) 1986-90; plus small-scale pilots in UK.

7.6.4.2 early deployment

- London Autoguide pilot originally planned for 1991/92

7.6.4.3 full scale deployment

- Commercial operation expected in London 1993; Scotland following the pilot closely. National operation envisaged.

7.6.4.4 cross-cutting

- The technical case was strong but financial, organisational and institutional factors led to a negative result. The pilot scheme did not happen. Important lessons for both sides in the negotiations.

7.7 Application Areas:

7.7.1 ATMS

- Autoguide was to link to UTC system (SCOOT).

7.7.2 ATIS

- Subscriber system delivering positive (turn-by-turn) and dynamic (traffic-responsive in real time) navigation and route guidance.

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