TRANSPORT RESEARCH
FOURTH FRAMEWORK PROGRAMME
STRATEGIC TRANSPORT
DG TREN -

ASSEMBLING

An Internet Service for European policy-analysts and decision-makers assembling information from a network of transport observatories

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EXECUTIVE SUMMARY

ASSEMBLING is a research project co-financed by the European Commission transport RTD programme of the 4th framework programme, as well as by a number of institutions in different countries. The main goal of ASSEMBLING has been the development of a prototype of information service for European policy-analysts and decision-makers. The information service is an web-based system that "assembles" strategic transport information coming from a network of monitoring centres (or observatories).

In order to study the technical and organisational problems of developing and sustaining such a network of observatories, five pilot observatories were selected covering the territorial complexity of the European Union:

	Geographic scope of ASSEMBLING pilot Observatories
TEMO	Greece in the East Mediterranean
NTO	Nordic Triangle corridor in Finland
RGO	Betuwe line project in Netherlands
PRO	Pyrenees cross-border regions
CETMO	Magreb countries in the West Mediterranean

Based on the experience developing the network of pilot observatories, and providing a common user-friendly interface to European policy-analysts and decision-makers to make the whole Internet system and actual "policy-information service", the project finally made specific recommendations for the European Transport Policy Information System (ETIS).

The starting point of ASSEMBLING Information System is realising that policy makers, end-users of policy-support systems such as ASSEMBLING, are mainly interested in the (near) future and not necessarily in monitoring the impact of existing policies and/or already built projects. The argument is mostly that the investments have been made, policies adopted, and nothing can change this. According to many policy makers, lessons for the future can seldom be drawn from a monitoring exercise, because the impact of each project and each policy is unique. One of the main objectives of the monitoring strategy is, however, to learn lessons from the past experience because even if infrastructure is already there, alternative traffic management strategies and policy regulations can always be modified, if there is evidence of their negative impacts. Moreover, a deep knowledge of the ongoing impacts is indispensable to improve forecast models at European level in relation to the growing complexity of the European transport system.

The technologic solution adopted in ASSEMBLING has been the provision of information services through Internet. A network of web-sites have been designed to provide executive and user-friendly access to harmonised information from observatories. Additionally, interactive backcast and forecast models were linked to

the system (called "knowledge-tools" because they help the user to explore interactively the potential impacts of alternative policy actions under study). Needless to say, ASSEMBLING is not a comprehensive knowledge-system assessing all policies and infrastructure projects in Europe (as ETIS pretends to be), but a working prototype demonstrating the interest and feasibility to develop and sustain an Internet service providing monitoring information and interactive knowledge-tools to European transport decision-makers.

ASSEMBLING prototype can be considered as an advanced "Internet Executive Support Service" since it gives answers to two main type of questions:

- *What's up?: Information concerning on-going transport policy needs and impacts. What's up?* answers are supported by information assembled from the network of the five ASSEMBLING pilot Transport Infrastructure Monitoring Centres: Nordic Triangle, Pyrenees, Rhine-Gateway, East Mediterranean Area, West Mediterranean Area.

- *What if?: Knowledge-tools linked to interactive backcast and forecast models. What if?* answers are provided by new and already existing transport forecast models linked in a way they act as efficient "knowledge-tools".

Additional to these two key services, information coming from European sources (e.g. EUROSTAT, DG TREN, 4th Framework Research Programme) has also been included, as well as references and hyperlinks to research projects dealing with policy-assessment methods (e.g. TENASSES, CODE-TEN...) and producing evaluation models (e.g. PAM, EFFECT...).

All in all, the ASSEMBLING project is about demonstrating the interest and feasibility of developing a mechanism to "assemble" regional and sectorial *information* into policy-relevant *knowledge*, useful enough for European policy-analysts and decision-makers to be integrated into ETIS.

1. OBJECTIVES OF THE PROJECT

The paramount objective of ASSEMBLING project is to develop and test innovative methodologies to develop efficient policy-information systems. More specifically, ASSEMBLING objectives can be summarised as follows:

- Assembling the existing disperse *data* and transform it in policy-meaningful *information* for European policy-analysts and decision-makers

- Guarantee the topicality of information by continual updating, and

- Present the information in a form that is accessible, understandable and useful to experts and decision-makers.

The methodology being studied is based on two hypotheses:

- The interest of a monitoring activity, focusing on integrating information from needs and impacts related to specific infrastructure projects and policies, to complement aggregated statistical data (there are a large number of information collection efforts -for instance ex-ante analysis of infrastructure projects and corridors- which, despite their quality and interest, have no continuity, remain non harmonised and often become obsolete and lost).

- The feasibility to organise and give access to this information as Executive Internet Service (including on-line advanced data retrieval and mapping, textual information and links to interactive knowledge-tools running remote forecast and/or evaluation models)

The feasibility of ASSEMBLING objectives is supported because current innovation on digital information and communication technologies (e.g. Internet) largely removes traditional concerns related to the access of non computer specialists to information systems and even to advanced decision-making tools, if these tools comply with key user requirements such as interactivity and friendliness. An effective policy-information system has nowadays also to be an interpersonal “communication-system”.

Because of its objectives, ASSEMBLING was designed as a “learning by doing” project. Therefore, rather than a theoretical and abstract analysis, it has been an applied research that has produced a working Internet Service demonstration prototype. By its nature as applied research aiming to produce operational results, ASSEMBLING followed a highly interconnected and decentralised development process, based on continuous feedback between developers and potential institutions hosting the observatories, as well as EC/DG TREN.

According to the "Value Stream" approach adopted, each ASSEMBLING Work package was led by one research partner who had to produce a specific deliverable defined to fulfil a precise user need. ASSEMBLING partners were urged by the co-ordinator to produce "throw away rapid prototypes" to provide a view of each partner's ideas and thoughts at an early stage of the research. Based on the analysis of

these prototypes, and the spontaneous cross-fertilisation provided by the simultaneous viewing of all final deliverables, successive "evolutionary prototypes" were developed. This process allowed all partners to "begin with the end in mind", an essential requirement for innovative research projects.

In more conventional "Stovepipe" management systems, work packages respond to the internal logic of the developer rather than that of the final user (consumer or client), and each one can be divided into different activities with many developers working with complex interrelations and input-output dependencies. While this management structure may be well suited to mature areas and mature partnerships (with little risk of failure at intermediate input-output steps), this is not the case for immature technologies (such as the development of information systems) and immature partnerships (based on heterogeneous multinational organisations working together for the first time, as it happened in ASSEMBLING). For these cases the adopted "value stream" approach adopted.

2. SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT

2.1. Theoretical framework of the analysis

The data as such is seldom informative enough to be used in the planning process and decision-making. Expert analysis and synthesis is needed to bridge the gap between objective facts (observed, measured and analysed statistically) and information useful to support decision-making (e.g. forecast results, expert opinions, summaries of studies, news from key media...). Even if a database is not a policy information service in itself, hardly a policy-information service can be developed with scientific consistency without using reliable and updated statistic databases to validate expert opinions, studies or news whenever feasible. So a balance between both is needed.

Broadly speaking, despite occasional and successful experiences (e.g. DG TREN Statistic Pocket Book), the main problems of the existing database and information systems supporting European transport policies are as follows:

1. Permanent data gathering without policy-analysis: the system of continuously updated and widely disseminated databases does not fulfil the requirement of analysed policy-information (analysis is missing and/or accessibility is difficult)

2. Policy-analysis without continuity: the system of ad hoc studies and research programmes does not fulfil the requirement of continuity and the databases used for each study are not necessarily compatible or useful for other purposes.

These technical problems are not independent from organisational and institutional frames (e.g. because raw data is often not offered for free by European statistical offices, it becomes more difficult the development of a dynamic market of added-value data services providing solutions to the mentioned problems). One well-known consequence of this situation is that, as far as an individual official, planner, researcher or decision-maker is concerned, it is increasingly difficult to form a general picture of the most relevant information that is needed to tackle a given policy problem, and how difficult is to find and use it.

Even more: there is a growing need to provide policy-analysts and decision-makers with software tools able to get access to these information in an interactive and user-friendly manner. Policy-analysts and decision-makers have to be “informed” and be engaged in permanent “learning” processes because the European transport sector is becoming much more complex from a planning point of view that it used to be in the past: Transport actors tend to be more diversified and heterogeneous, and transport decisions are involved in an increasingly difficult multiparty negotiation process since transport tends to follow a global "networked" logic and national and regional administrations are constrained by their own territorial boundaries. Moreover, new policy-goals, such as “sustainability”, are changing the traditional way decisions were taken since they show the interdependencies between sectors, geographic scales and

time periods, leading to a “scientific uncertainty” in relation to the capacity of forecast models to predict the impact in the whole system of a sectorial policy (and therefore emphasising the need for continuous monitoring).

The foreseeable trends defining the changes in the needs for strategic transport assessment are summarised in the next figure (*Schematic presentation of the trends that are grounds for the need of a web-based information system)*

	Previous paradigm	**Current paradigm**
Transport policy problem	Mobility	Sustainability
Transport infrastructure	Construction of new infrastructure	Management of transport as integrated networks
Decision making	Socio-economic rationality	Social agreement
Important argument in decision making	Expert opinion	Social opinion
Process for drafting transport policies	Experts => authorities => decision makers	Experts => authorities => public discussion => decision makers
Planning paradigm	Procedural rationality	Communicative rationality
Information needs	Traffic forecasts	Impacts on environmental, social and economic sustainability
Tasks for experts	Develop models and methodologies	Popularise results

2.1.1. New user-requirements for policy information services

Scientists and policy-makers typically have different ways of thinking. This fact is the necessary starting point when exploring the user-requirements to provide scientific support to policy-analysts and decision-makers. Next table gives an overview of the purely “scientific” and “political” decision-making approaches:

Scientific decision-making	**Political decision-making**
Start with the data: Almost free from prejudices.	Start with a provisory solution to be validated and modified
Rational formulation	Adaptive behaviour based on intuition
Large volumes of information	Limited access to information
Inductive in-depth analysis	Deductive search for "patterns"
Specialised: Sectoral analysis	Global: Multi-sectoral synthesis
Large volumes of calculations, slow conclusions	Rapid expression of personal perceptions
Optimisation strategy from all possible solutions	Satisfying strategy based on "acceptable" possibilities

Scientific models may “support” policy-analysts advising decision-makers, but decision-makers cannot be replaced. People can be considered “expert” when they have “experience” (personal and subjective) but not necessarily deep knowledge of scientific theories and capacity to use advanced computer models by themselves.

A decision-making process supported by scientific rationality involves a number of steps to compress raw data into information, information into knowledge and knowledge into decision. The “compression process” can claim a “scientific” pedigree when it is systematic, transparent and objective, and is based on theories and assumptions universally valid.

Adetailed database at European level for transport could require one Gigabyte (so 1.000.000.000 bits) stored on one computer system or dispersed in many (nowadays, the typical hard-disk of a PC already has few Gigabytes). Statistic models take raw databases (many Gigabytes) as input to produced more compressed information (e.g. few Gigabytes or many Megabytes). Forecast models then produce few Megabytes of new information, typically trends of policy indicators, mainly those measuring the accomplishment of policy goals or giving a better understanding of the system. Evaluation and assessment models (e.g. Impact assessment, Cost/Benefit, Multicriteria analysis) produce some Kilobits, typically tables with comparisons and rankings between alternative policy actions and their impacts across social groups (e.g. equity evaluations), experts can even recommend a particular option. Based on this advise, the decision maker (at the end use to be a single person) has to say just “YES” if he agrees, or “NO” if he still has doubts (e.g. because the “rational process” did not include a relevant issue).

In a democractic society, a policy action (so a policy decision) is, at the very end, “simply” a “YES” or a “NOT” statement (so 1 bit), and it has to be made by a human being, the one responsible for its implementation and further impacts in front of their fellow citizens. The crucial question is how to maximise the benefits of scientific support (as learning tools to reinforce policy-makers better understanding of the problem) and minimize risks (the oversimplification of problems and the use of models as “magic” tools). To the usual user-requirement: “minimum access difficulty to maximum capabilities” a specific requirement for transparency has to be added. Policy-analysts and policy-makers should not accept or reject any scientific advise because of the prestige of the scientist providing it: they have to do their best to actually understand it. ASSEMBLING approach is based on this highly demanding requirement.

2.1.2. The need for a policy-monitoring approach

The increasing complexity of more interconnected and networked contemporary societies has obvious implications on policy decision-making: from a traditional medium and long-term “policy optimisation” approach, there is a move towards a “policy satisfaction” approach supported by the permanent monitoring of key indicators.

Next table provides for a summary of the implication of these ideas.

	New policy approach: **Policy satisfaction**	*Conventional policy approach*: **Policy optimisation**
Main activity	Monitoring	Predicting
Domain of reality	Key aspects	The whole system
Tools	By indicators as simple as possible	By models as comprehensive as feasible
Data	Based on ordinary statistical data, when feasible	Based on specific surveys, requiring missing data
Operation	Many on-line impact analyses controlled by the decision-maker	Few batch-runs of models controlled by the expert

Needless to say, both policy approaches (satisfaction *versus* optimisation; monitoring *versus* forecasting) are complementary: Monitoring, for instance, constitutes the best way to improve the quality and value of medium and long-term forecast models (e.g. it provides precious data, homogeneous time series of key variables allowing a continuous re-calibration of models), as well as provides for a direct information source (e.g. regarding the short-term positions of all actors affected by actual policy impacts).

In the context of the ASSEMBLING research, a pilot network of monitoring initiatives (or "observatories") has being developed to monitor key transport European questions in selected areas and sectors. The aim of this network is not much to provide quantitative "data" to feed mathematic models, but to provide information to be used, directly, by experts and top decision-makers.

2.2. Review of the experience of existing observatories

2.2.1. What's an observatory?

A restrictive definition of an "observatory" may be as follows: "any local, regional, national or trans-national body (formal or informal, official or not) which manages data and information systems relevant to a given transport investment".

A large variety of constituencies has been encountered during ASSEMBLING inventory: Non Governmental Organisation (CRPM), private company (MDSTransmodal), non profit association, (Resource Renewal, Plan Bleu, IAAT, ORT Alsace,), department of an administration (BASTs,), informal constituency dependent on public sector (Plan routier breton, ORT Nord-Pas-de-Calais), ad hoc constituency (Strait of Gibraltar,).

The research has shown that several other profiles may be, to some extent, also considered as observatories, particularly the structures developing information systems in domains directly related to transport (environment, energy, etc …). The emergence of Internet has strongly increased the diversity of observatories, with web forums, Internet "clubs", etc…. Therefore observatories can also be viewed as interactive information tools used to highlight key transport indicators, impacts and policy issues.

To be more flexible one could state that a "Monitoring Centre" or an "Observatory" is any institution (public or private) devoted to collect and/or harmonise transport data. Two other conditions must be fulfilled: it should have a permanent constituency and the aim of the information system should not be only to produce only 'official' statistics. An observatory can also be seen as a "market place" or "portal" for strategic transport information. In more concrete terms, it is a continually updated report on strategic transport questions, focusing on a specific geographical area (country, corridor). And the report is freely available through Internet. The organisation (persons) responsible for the updating of the information can change yearly or maybe after every 2-3 years. But the "virtual" observatory remains the same.

In conclusion, Monitoring Centres or Observatories are any local, regional, national or trans-national body (formal or informal, official or not) which manages information relevant to transport or to domains directly related to transport impact (CO_2 emissions, energy, etc …). For example a thematic environmental observatory is the node providing cross-cut analysis of transport network information and environmental data with the purpose of presentation easy-to-interpret assessment and indicators of current and potential impact of the existing and projected infrastructures on the bio-diversity in Europe.

According to the results of the analysis carried out, key factors of a successful monitoring strategy are the following ones:

- *Flexible and adaptable management*, in particular when the observatory has an international network.
- *Political neutrality* (from an administration, from a professional organisation) is a crucial aspect. It ensures an efficient choice of priorities and more objective approach in the case of possible conflicts between different types of members and partners of the observatory. Neutrality can be reached by financial autonomy or a mix of participants in the observatory (public/private, for example).
- The involvement of the private sector together with the public sector seems to lead to positive effects on the observatory activity.
- The human involvement is a key of success.
- A clear definition of the objectives of the observatory (well-defined and as concrete as possible) is a condition of success.
- Objectives must be planned with a detailed schedule.
- The information systems must be compatible and interoperable. This means that they must be standardised, or compatible with standard systems.
- The value added is higher if the observatory provides analysis and consultancy in addition to data as such.

We defined as Monitoring Centres or Observatories any local, regional, national or trans-national body (formal or informal, official or not) which manages information relevant to transport or to domains directly related to transport impact (CO_2 emissions, energy etc). Most of these institutions were inventoried and the most relevant ones interviewed in order to get direct information concerning the type of existing observatories, their organisation and information system, as well as the reasons for their success of failure. All this information was used when defining the information systems and the optimum constituency of the ASSEMBLING network of pilot observatories.

2.2.2. Typology of existing observatories

Two main types of observatories were discovered:

- Regional or local structures dedicated (generally) to a specific domain which may be an infrastructure investment, road safety on a given set of roads, forecasting traffic through a given infrastructure etc. These structures rarely have a web site to support their activity.
  The objectives of these observatories can be broken down into different categories: to observe and develop specific infrastructure projects (TEM, TER, Gibraltar strait, TGV North, Eurotunnel, Plan routier breton); to improve the development of a Region or a group of Regions having common interests (Regional Observatories of Transport, CETMO, Plan Bleu, CRPM, IAAT); or to provide a wide spectrum of information to transport sector professionals, with a wide dissemination (OEST, CETMO, MDS Transmodal, BASTs.).
- International bodies, sometimes informal, generally have a broader scope of interest. Their aim is to disseminate or exchange information on a subject of "common interest" as, for example, global warming, improving transportation systems for large

central cities, promoting knowledge about transport or supporting the development of environmental friendly means of transport. The development and animation of these organisations is, most of the time, supported by well established structures such as a University, a Ministry Department or a professional association. Their web sites are key tools for communicating with their members and with non-members. The information is provided either under the form of permanently updated bibliographic information or through the organisation of web forums, by data supply, etc.

For the majority of observatories inventoried, the target clients are mainly institutions: national administrations, local authorities, the European Commission... However some of them combine public and private clients (transport professionals, consultants). For those observatories which are public sector offshoot, data are provided free or at marginal cost. Very few of them sell their outputs at a price which covers their operating costs (except private organisations).

2.2.3. Organisation Framework

The large variety of organisational frameworks encountered during the inventory can be clustered in the following organisation frameworks:

- Non Governmental Organisation (CRPM)
- Private company (MDSTransmodal)
- Non profit association (Plan Bleu, IAAT, ORT Alsace, ORT Aquitaine)
- Department of an administration (OEST, BASTs)
- Informal organisation dependent on public sector (Plan routier breton, ORT Nord-Pas-de-Calais)
- Ad hoc organisation (Strait of Gibraltar, TGV North)

There is no co-ordination or synergy between the monitoring centres analysed; despite their frequent assurances that they are willing to co-operate and exchange experiences with other organisations. The differences in culture and context can explain this situation. In fact, there has been much resistance in the past to co-operation as the management of data provides a power base. It seems that co-operation between observatories in complementary fields (transport, tourism, environment) is easier than between those in the same field (transport)

2.2.4. Reasons for success and failure

The main reasons for the success of an observatory are: how will their objectives match user needs, the stability of the observatory goals during its life time and often the willingness of one person to provide the initial impulse for development. And the main reasons for failure are: lack of finance, this most often happens when the

observatory is no longer a priority (for example: the investment for which the observatory was created is completed, the measures for preventing accidents have become effective etc.); goals too ambitious; and competition and conflicts within the organisation.

2.2.5. "Lessons" for ASSEMBLING observatories

- A clear definition of the objectives of the observatory (as well defined and as concrete as possible) is a condition of success.
- The information systems managed by the observatories should be compatible and interoperable. This means that they must be standardised or compatible with standard systems.
- The value added is higher if the observatory provides analysis and consultancy beyond the data themselves.
- The dissemination must be regular and, if possible, frequent and on a wide scale.
- The organisation must be flexible and adaptable, in particular when the observatory has an international network.
- Neutrality (from a National or Regional Administration, from a professional organisation) is a crucial aspect. It ensures an efficient choice of priorities and a more objective approach in the case of possible conflicts between different types of members and partners of the observatory. Such neutrality can be the result of financial autonomy or mixed participation (public/private). With a single source of finance, the observatory is little more than a study department for the host body.
- Above all, human involvement is a key for success

2.2.6. The Directory of information sources and observatories

The main objective of the Directory is to provide the policy maker with a user friendly computerised tool allowing easy identification of a large number of monitoring centres dealing with transport and with related fields such as energy and environment, mainly through the identification of their web sites. It is directly derived from the Digital Data Guide (DDG) developed in the framework of the "Bridges" project, part of the fourth Framework Program. The Directory provides the European Commission with a tool having two main functions:

- A function of identification of the sources of information and digital databases dealing with monitoring centres in Europe, which have a specific focus on transport;
- A function of description of the characteristics of these sources and databases.

The Directory is an Internet interactive application structured in two modules:

- Information providers. In relation with the objective of ASSEMBLING, this module contains several "non official" and "informal" information sources acting as monitoring centres, as well as relevant protocols, white and green

books, decisions, which correspond to the level "actions" of the ASSEMBLING approach;

- Database products, which correspond to the levels "knowledge" and "data" of the ASSEMBLING approach.

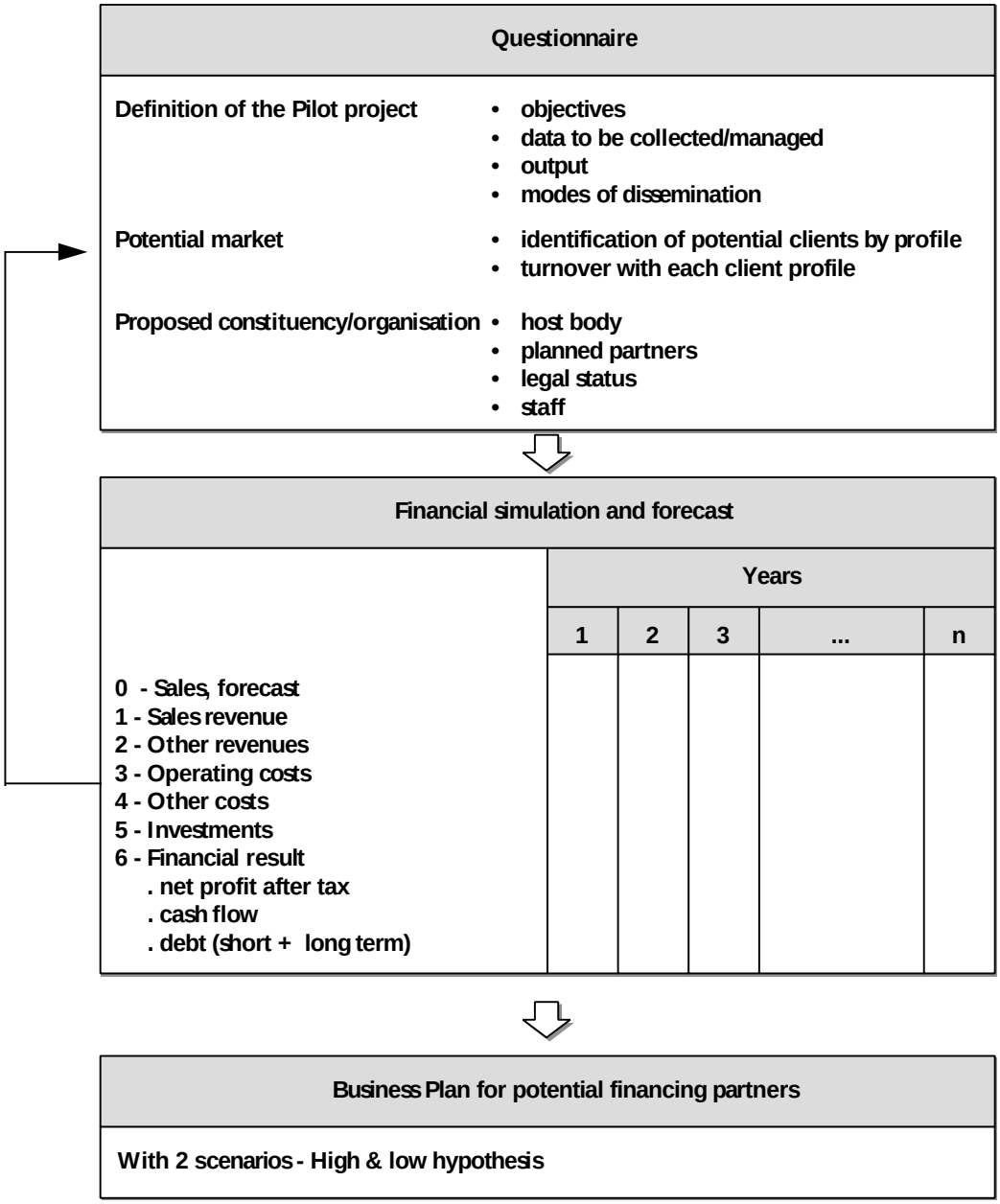
In its present version the Directory contains about 1.500 relevant information providers or database products. Given the huge number of data sources in Europe in the field of transport (thousands of road operators, hundred of sea carriers) the Directory has been designed as a "living" tool, any user having the possibility to include additional information.

A system of queries allows the user to identify all information providers covering the same geographic field, all information providers having the same activity (an activity being for example: sea carrier, newspapers, professional association) and all information providers dealing with the same ETIS variable(s). In its current version the Directory contains 902 providers and 563 products. It should be stressed that some information providers may contain up to 20 database products. Conversely, several information providers have no corresponding database product.

The "information providers" are defined by their country of location. The database products are defined by the geographical area covered by data (national or multi-national). Each "information provider" is characterised by its main activity, according to the typology indicated in the following table. By comparison with the DDG developed in the BRIDGES project, several activities dedicated to non transport areas but being relevant for policy decisions have been added (demography, economic and finance, environment, food and agriculture, etc…) as well as new activities directly related to specialised web directories.

2.2.7. Questionnaire to develop business-plans for observatories

The next scheme contains a methodological scheme for the detailed assessment of pilot observatories. It is based on the experience of all observatories being analysed.


Questionnaire
Definition of the Pilot project
• objectives
• data to be collected/managed
• output
• modes of dissemination
Potential market
• identification of potential clients by profile
• turnover with each client profile
Proposed constituency/organisation
• host body
• planned partners
• legal status
• staff
Financial simulation and forecast
Years
1
2
3
...
n
0 - Sales, forecast
1 - Sales revenue
2 - Other revenues
3 - Operating costs
4 - Other costs
5 - Investments
6 - Financial result
. net profit after tax
. cash flow
. debt (short + long term)
Business Plan for potential financing partners
With 2 scenarios - High & low hypothesis

The questionnaire will be the basis of a common framework for the business plans. The overall structure of the questionnaire is given hereafter.

A. Definition of the pilot projects	• Identification of the observatory name, profile, state of development..)
	• General objectives
B. Proposed constituency	• Institutional and legal framework
	• Host body
	• Organisation (staff, members...)
C. Potential clients	• Core clients
	• Additional client
D. Output of the observatory	• Output
	• Mode of dissemination
	• Cost for output
	• Revenues for sale
E. Data collected	• Nature of data
	• Availability
	• Type of treatment
	• Staff & equipment necessary
F. Costs for office and equipment	• Office equipment
	• Office rental
	• Other costs
G. Financial forecast	• Financial resources
	• Operating cost breakdown
	• Investment
	• Financial result
H. Cooperations with other constituencies or participation in a network	• Cooperations, formal or informal
	• Participation in a network

The detailed questionnaire is included as annex to this report.

2.3. Definition of European Transport Regional Observatories and selection of pilot-case studies

ASSEMBLING has developed five European Transport Regional Observatories, as pilot case-studies. All information systems share the same basic structure and are implemented as websites. Rather than collecting data or being primary source of information, they are understood as interfaces between regional and European scales, to be mainly used by European policy-makers and experts. The paramount goal of each observatory is providing policy relevant information supporting European transport policies.

2.3.1. Selected pilot observatories

The five monitoring test-cases included in ASSEMBLING cover very different geographic areas, and have complementary interest in relation to the development of information systems and the analysis of their institutional and political frames.

	Geographic scope of ASSEMBLING pilot Observatories
TEMO	Greece/East Mediterranean
NTO	Nordic Triangle in Finland
RGO	Betuwe line project in Netherlands
PRO	Catalonia/Pyrenees
CETMO	Magreb countries/West Mediterranean

	Interest in terms of planning/information system
TEMO	Integration of national data in a context with regular data availability
NTO	Provision of friendly access to already existing data. Definition of the best web structure
RGO	Use of data and information in modelling work
PRO	Integration of regional data and qualitative information (e.g. news)
CETMO	Collection and dissemination of official data

	Interest in terms of institutional/political
TEMO	Private and semi-public involvement (case of Chambers of Commerce)
NTO	National involvement (Ministries co-financed NTO) in a context with low political controversy.
RGO	National versus European planning interests. Policy implications of the European monitoring activity: Why project-related observatories are needed?
PRO	Regional versus national involvement in the organisation ob observatories
CETMO	International bodies linked to United Nations and countries

The NTO case (because its more advanced situation in terms of information system, and less complex political and institutional frame) played a leading role in the process of harmonisation.

2.3.2. Harmonised information systems for observatories

Common structure of Monitoring Information Systems

All European Transport Regional Observatories have to have the same minimum structure of information. Based on the leading experience of the NTO pilot case, the following structure for the information system was been adopted for all observatories websites:

Driving Forces	Information on Web site
Question • What factors are affecting the demand for mobility?	**Driving forces** Figures and charts describing the driving force towards the transport system: • Geographic and urban structure • Population and housing • Economic activity
The state of the transport system	Information on Web site
Question • What is the existing state and trends of transport infrastructure, traffic and its impacts?	**Infrastructure & Traffic** Figures and charts describing the existing state of the transport system per mode: • Institutional setting • Infrastructure • Vehicles • Transport • Traffic safety/accidents • Environment
Policy response	Information on Web site
Questions • What is the desired future of the transport system? • What actions are being taken to change the existing system? • What will be the impacts of the actions?	**Goals and policies** Description of the stated transport policy goals at different levels: • Common European transport policy • Regional (e.g. Nordic0 dimension in transport • National policy guidelines until 2020 • Regional development strategies regarding transport **Projects** Description of the planned and ongoing projects regarding: • Infrastructure • Traffic management • Institutions • Research • Road Safety **Impacts** Description of the expected impacts of the planned and ongoing projects regarding: • Infrastructure • Traffic management • Institutions

An Internet-based technologic solution

Internet was adopted as the best technologic solution to support ASSEMBLING information system, since the goal was to facilitate an easy and friendly access to the system to European policy-analysts and decision-makers, as well as to other European experts.

During the last months of the project (first half of year 2000) new software tools begun to provide for efficient solutions to develop highly customised user-interfaces linked to database managers, able to retrieve and present information in a communicative manner (using hypertexts, graphics, dynamic visualisation and mapping, etc). However the advances on the tools available commercially, the Internet solution has required to explore original ways to provide advanced and specialised functionality's (interactive GIS and modelling) to ASSEMBLING users. Two main software strategies were adopted: a CGI solution (running on the Lynux O.S. of Karlsruhe University) and an original ASSEMBLING Internet Server application (running on Microsoft Windows NT). Both solutions are able to establish an interactive communication between remote clients (users), and Database managers, GIS applications and models acting as server applications.

ASSEMBLING Internet Server (AIS) is an original Java application; it has been programmed compatible with Bridges technology (4^{th} FP), specially with Bridges Communication System and Bridges Network Information System (NIS).

The ASSEMBLING Internet Server works as follows:

- For most information, the user gets the usual html pages compatible with Microsoft Explorer and Netscape Internet browsers.
- For interactive data search, GIS and models using ASSEMBLIG AIS, the client gets a web page with a map a the functionality's (map selection, view selection, information retrieval). The html code of the page contains Java script sentences which store the user's requests and translates into Bridges Communication System's messages.
- When the user sends its request, the AIS receives the message and channels it through the Bridges messaging system, which activates the application(s) responsible to deliver an answer though their translators (OLE/COM container applications).
- Once the answer is produced (e.g. a JPG file with a table, a map), this is notified to AIS by Bridges Communication System, which takes a pre-defined page layout, inserts the image and send it back to the client.

Common layout of user-interfaces for all observatories

Based on NTO initial proposal and subsequent discussions, the following website layout was adopted by all other observatories (with minimum design differences, but always following the same structure):

Top Level (Home page)

- Introduction to the system with additional “about” information
- Main links (national transport administrations)
- Where are we now? questions (Expert memo, Directories, Scenarios)

Second level (Driving forces, Transport & Traffic, Goals and policies, etc.)

- Introduction of the contents of the particular section

Third level (General view, population, economic, road, rail, etc.)

- Table of contents on top of the page
- In the margin, there is additional information in the form of maps, trend graphs and “information boxes”

Fourth level (Maps, trend graphs and “information boxes”)

- Additional information related to the main points or cross-section data presented on level three;
- Maps and graphs are printable on one A4-sized paper (orientation: landscape for maps, portrait for graphs).

Fifth level (Maps or trend graphs in the margin of the texts on level four)

- Additional, more specific information related to the main points presented on level four;
- Maps and graphs are printable on one A4-sized paper (orientation: landscape).

2.3.3. Constituency of the observatories

Institutional problems were the major difficulty for the observatory’s build up. Concerning the different observatory types, a purely private or public status is unattractive, basically because the private sector is unwilling to generate all the necessary capital for start-up costs while the public sector might lose interest. From the administrative point of view, we encountered difficulties in persuading national administrations that there is a value added (since all the information is available but not from a single source). The conflict of interest between a misinterpreted strategic/European and current limited project/local objectives was obvious. Also, there were problems with control over who is using the data and whether the information will be used against their interest. Even after convincing the authorities of the value of the concept, there was political but not technical support as this would have required funds which tight budgets did not allow.

All considered, four alternative concepts (and a number of possibilities "in between") were analysed for each pilot observatory:

- 'Private business': A company to host the observatory will be founded. The incoming data is partly paid for and the use of the Internet service is charged for.

- 'Association': A registered association will host the observatory. Members of the board represent the sponsors (governmental etc. agencies). The incoming data is mainly obtained free of charge from the sponsors. The use of the Internet service is not limited or charged for.

- 'Administration': The Monitoring System will be part of the duties of certain individuals within the Ministry of Transport and Communications of a National Administration. The incoming data is mainly obtained free of charge. The use of the Internet service is not limited or charged for. External services (research institutes, consultants) may be used in some parts of the monitoring.

- 'Project': A research institute or consultants chosen after competitive bidding will host the Monitoring Centre. The European Commission, in co-operation with national authorities (e.g. Ministry of Transport and Communications...) will be the co-ordinator and major sponsor of the project. The length of the contract would be 1-3 years.

For all pilot cases, solutions based on the "Project" alternative were selected as the more convenient constituency because of the limited institutional structure it requires, the flexibility of management and the reduced cost (if no direct data collection is carried out by the observatory). If the network of observatories have to provide independent, politically neutral and scientific consistent information for European policy-analysis, the European Commission have to play a leading role in its development.

According to the results of the experience of working on all observatories, the following conclusions can be drawn:

- Neutrality (from a National or Regional Administration, from a professional organisation) is a crucial aspect. It ensures an efficient choice of priorities and more objective approach in the case of possible conflicts between different types of members and partners of the observatory.
- The value added is higher if the observatory provides analysis and consultancy in addition to data as such. Often, expert opinions should remain confidential (as the Rhine Gateway experience shows). Links to models and other analytic tools increase the policy-contribution of the observatory.
- The more convenient geographic scope is regional or interregional, but strategic infrastructure projects (e.g. Essen priority ones) may require the establishment of project-related observatories. The cost of project-related observatories is higher (since they probably need to act as direct source of information) and its implementation may involve policy-sensitive issues (e.g. subsidiarity concerns from Member States). Needless to say, its political interest at European level is also higher since they are closer to actual policy needs and impacts.

2.4. NTO Internet Service (Nordic Triangle)

As mentioned, NTO pilot-case has played a leading role in the development of ASSEMBLING network of observatories. NTO was the first pilot case solving organisational problems (because of its the "national" coverage, and the willingness of Finish institutions to co-operate with the project, it had less difficulties than other cross-border and international pilot cases) and developed the first prototype of the information system and website layout. NTO prototypes helped in discussing and adopting the common criteria to develop all other observatories further on.

2.4.1. Geographic area and policy framework

NTO covers the area of Southern Finland, the region crossed by the Nordic Triangle corridor. Therefore, NTO is a national observatory. The Finish policy framework, in relation to other European countries can be defined as open and participatory. National institutions use to publish data and information in Internet (often with English translations) and there and have different monitoring activities. NTO development within ASSEMBLING was co-financed by a number of Public Administrations in Finland. Needless to say, this situation is radically different from all other pilot cases.

2.4.2. Objective

The goals that have guided the development of the Nordic Triangle pilot observatory (NTO) are elaborated below:

- NTO assembles information (i) that is relevant to strategic transport planning (validity); (ii) that covers the driving force, the existing state of the transport system and the policy response, and (iii) that contributes to answering strategic EU and national transport policy questions.
- NTO information management strategy is (i) to guarantee continual updating, and (ii) to include analysis connecting the information to the policy questions at different levels of decision-making.
- NTO dissemination strategy is to guarantee unlimited access to all information.
- NTO strategy for viability requires (i) that role of observatory is complementary to other national and international institutions providing transport data; (ii) that the operation costs of the NTO are reasonable, and (iii) that the monitoring concept is open to continuous development.

Some of these goals cannot be achieved simultaneously. For example, reasonable costs and extensive coverage of information can be conflicting goals.

2.4.3. Information system and maintenance

The basic idea of the NTO Web site is to present general descriptions, research results, cross-section data, trend figures, thematic maps and hyperlinks that are

relevant to *strategic transport planning.* An important factor is the structure of information. The argumentation for the structure adopted by the Nordic Triangle pilot observatory lies within the conceptual framework of transport policy (Driving Force / Existing State / Policy Response).

The technical and operational strategy of NTO is as follows:

- Data and information is mainly collected and maintained in an electronic format (GIS files, spreadsheet files, text documents, pictures);
- When a particular piece of information is available only on paper (report, clipping), it is filed as a background document but summarised in a text document or database in the electric archives;
- The output format is an unprotected Web site
- The Web site will at least have to be linked to the central Web site, and the Web sites of Finnish Ministry of Transport and Communications, Finnish Road Administration and Finnish Rail Administration.

The NTO information system was build partially based on the E18 development study.

2.4.4. Organisation and business plan

As regards the organisational concept or the institutional arrangements of the NTO, the four alternatives were been analysed in relation to the above listed key factors of successful monitoring strategy, and the 'Project' alternative can be considered as the most viable one.
The Business plan of NTO, expressed as expected costs per year, is summarised in the following table:

	Year				
	2001	2002	2003	2004	2005
Labour costs of maintenance (Euro)	13 000	13 500	14 000	14 500	15 000
Labour costs of development (Euro)		10 000		12 000	
Expert costs	10 000	10 000	10 000	10 000	10 000
Costs of Web server maintenance (Euro)	1 000	1 000	1 000	1 000	1 000
Total need for public financing (Euro)	24 000	34 500	25 000	37 500	26 000

2.4.5. Conclusion and further work

It can be concluded that Web-based dissemination of transport policy information will have an increasingly important role. That is due to the increasing use of Internet as a source of information, and to the increasing role of public and institutional participation in the strategic transport planning and decision making. The maintenance and further development of the pilot NTO Web site can thus be regarded reasonable.

The costs of maintenance are relatively low. However, as the basic idea of the NTO Web site is to provide information free of charge, public financing is required. There are only two potential sponsors: Finnish Ministry of Transport and Communications and the European Commission. Ultimately, it is up to those organisations to decide whether this kind of an information system is worth maintaining and developing. The already identified development needs of the NTO Web site are as follows:

- The area of scope should be expanded to cover the whole of Finland and the Baltic States (Estonia, Latvia, Lithuania);
- Specific attention should be paid to monitoring the development in Russia;
- Feedback from potential users of the Web site should be collected systematically (for example by asking annually 200-300 transport experts, officials and decision makers to fill in a query on the Web site) to develop the Web site to meet the needs of the users;
- Monitoring of research results should be developed to be more comprehensive and analytic, without losing the goal of "popularisation";
- Development of a "news directory" should be considered to answer "Where are we now" questions regarding, for example, policy initiatives and public opinion;
- The Web site could be made bilingual (English / Finnish) in order to facilitate a wider international discussion on transport policy issues.

2.5. PRO Internet Service (Pyrenees)

2.5.1. Geographic area and policy framework

The Pyrenees (400 km length) have traditionally formed an impenetrable barrier except at their Mediterranean and Atlantic ends, where natural corridors exists (this explains why Basque and Catalan cultures can be found in both sides of the mountains). Nowadays, any new route not crossing the Pyrenees by the Atlantic or the Mediterranean (e.g. the so-called "Central Crossing Corridor") will require extensive tunnelling; the access to tunnels will be difficult and will have an impact on the landscape.

The Pyrenees consists of seven regions: Aquitaine, Midi-Pyrenées and Languedoc-Roussillon (France), Euskadi, Navarra, Aragón and Catalonia (Spain) and Andorra.

In the north, the Pyreness only occasionally are more than 30 km width; Aquitaine, Midi-Pyrenées and Languedoc-Roussillon, the three French regions, are relatively flat areas. In the south, specially in Catalonia, the terrain is more difficult, being composed of a number of small interconnected valleys. All considered, Spanish regions (Euskadi, Navarra, Aragón and Catalonia) present much more diversity in terms of landscape, economic and even cultural aspects than the French ones. And still there is an independent valley, Andorra, with a special political status.

The largest on-going infrastructure project is the High-speed Train South (one of 14 Essen Priority Projects). Madrid-Barcelona-Perpignan line is under construction (should be finalised in 2004). Madrid-Vitoria-Bordeaux line construction has not yet started. Both lines will be devoted to passengers (except Barcelona-French border) with a European gauge. Rail interoperability is therefore an important policy issue in Spain.

The other important ongoing policy issue is related to tolled motorways. There is a process of reducing or removing tolls in Spain, which is producing significant traffic increases in motorways that previously had big excess capacity.

2.5.2. Objective

The objective of PRO is to collect and present strategic information concerning the cross-border region and, specially, the ongoing regional and interregional transport infrastructure projects.

Because of the relative importance of the Metropolitan Area of Barcelona (its 4.5 millions population is twice that of any other region in the Pyrenees), it will receive special treatment. Information related to land use plans in the Metropolitan Area of Barcelona is also included.

2.5.3. Information system and maintenance

To the five standard levels of information for all observatories, PRO adds the following levels:

- Expert Memo: A neutral expert provides (on a weekly or monthly bases) an updated confidential report summarising "hot policies", "key actors" and the on going discussions in the regions, as well as other interesting news from a European perspective.
- Directory of News: Selection of the most important news published in relevant mass media, inventories and
- Directory of Studies: Summaries of the most relevant studies being published in the region, as well as co-ordinates for experts and institutions dealing with the different issues.

Format	A clearly structured Web site.
Languages used	The language of the pilot PRO Web site is English. It is proposed, however, that all or parts of the information should be provided in other languages (Spanish, French, Catalan and Basque).
Confidentiality	There will be no confidential data on the PRO Web site. Only public data sources are used. However, expert memos should be confidential.
Type of data and other information	The information typology of the PRO comprises: • Reference data and indicators • Interactive GIS visualisation tools containing original PRO networks (at municipal level for all regions in the Pyrenees) • Hyperlinks to other relevant information sources available on the Internet. • Expert-reports • News/Studies Directories • Overall Scenarios

2.5.4. Organisation and business plan

The main ongoing monitoring initiatives in the Pyrenees are the following ones:

- *Spanish and French Joined Observatory of the Pyrenees* (Ministerio de Fomento / Ministère de l'Equipement). After one year's work, a first brochure with synthetic data is going to be published soon (before summer 2000). Data comes from external sources.
- *Observatoire des Traffics au travers des Pyrenées* (Direction Régionales de l'Equipement. Aquitaine, Midi-Pyrenées, Languedoc-Roussillon). Avril 1999. Different brochures with data have been presented. Data basically comes from French surveys in the border regions.
- *Interregional Communication Commission of the Pyrenees Working Group* (CTP). SICOP includes general data and specific information regarding infrastructure projects. It is now maintained by the Institut d'Estudis Territorial (Regional Government of Catalonia).
- *Website for the Catalan Pyrenees developed by the Regional Government of Catalonia*. It contains, basically, information useful to tourists. It is under development by the Universitat Pompeu Fabra.

Contacts with all of these initiatives (most of them were developed after the starting of ASSEMBLING) showed that each one of them has a very different organisational and policy information goals. It has been neither feasible nor convenient to integrate all of these monitoring initiatives into a single effort, but to establish adequate links so at least basic reference data can be shared and PRO can act as "Europen interface" between them and European policies.

The main conclusion is, therefore, the need to develop European Transport Regional Observatories totally independent from other initiatives and focusing on the integration of useful information for European transport policy-analysts and decision-makers rather than the collection of data. It is for this reason that PRO included expert analysis and news releases within its website structure.

Contacts with neutral and scientific-oriented institutions, such as the Institute of Territorial Studies of the University Pompeu Fabra, indicate that it is feasible for this institution to carry on the development of PRO, once the first advanced prototype exists, even if no European financial source is available.

The costs of maintenance comprise labour costs (approximately 1 man-month per annum) and the costs of Web server hosting (approximately 1 000 EUR per annum). It is assumed that the maintenance would be the duty of one expert whose charge per hour is 80 EUR. Thus, the total costs of maintaining the PYR Web site would be approximately 14 000 EUR per annum. To these technical costs, expert costs should be added (15.000 EUR).

In addition to the maintenance, there is a need for continual development of the PYR Web site. The process includes the analysis of the received feedback, and the development of the Web site to meet the needs of the users. The total development costs of the PYR Web site would be approximately 5 000 to 10 000 EUR every second year. The basic idea of the PYR Web site is to provide information free of charge. Therefore, European public financing at a Europe wide or local level could be required to cover 30 000 – 40 000 EUR per year.

2.5.5. Conclusion and further work

The costs of maintenance are relatively low. However, as the basic idea of the PRO Web site is to provide information free of charge, public financing is required.
The already identified development needs of the PRO Web site are as follows:

- The area of scope should be expanded
- Monitoring of research results should be developed to be a more comprehensive and analytic, without losing the goal of "popularisation";
- Development of a "news directory" should be considered to answer "Where are we now" questions regarding, for example, policy initiatives and public opinion;
- The Web site could be made multilingual (English / French / Spanish / Catalan / Basque) in order to facilitate a wider interregional discussion on transport policy issues.

2.6. TEMO Internet Service (East Mediterranean)

2.6.1. Geographic area and policy framework

TEMO covers Greece, and more specifically the Combined Transport Corridor Greece-Italy.

The 'Public-Private Partnership' constituency alternative can be considered as the most viable one, combining the financial backing of the public sector and the possible continuous interest of the private sector.

2.6.2. Objective

The specific purpose of TEMO pilot case is to study the possibilities of establishing and sustaining an observatory, which collects, analyses, disseminates and updates information that is relevant for the transport policy decisions concerning the Hellenic Freight Villages Network and Combined Transport Corridor Greece-Italy. During the course of the project elaboration, it became the apparent that the area to be covered by the Observatory had to be extended to include also Eastern Mediterranean and Black Sea.

Thus, the more precise objectives for the pilot observatory try to cover all the objectives that were listed above:

- Identification of Greek & Italian transport data sources
- Establishment of a Transport Database on transport flows, socio-demographic information & transport infrastructure data
- The legal organisation and the link with actors must be defined through the establishment of a permanent host

2.6.3. Information system and maintenance

Next table contains a summary of TEMO information system:

	Maintenance procedures
Texts	Ad hoc: Add results from relevant sources (projects, news, studies) Main sources: General expertise, Public Reports of Ministry of Transport and Communications, Ministry of Public Works, Ministry of Mercantile Marine, Hellenic Railway Organisation, Conference results, Policy Reports, Newspapers, European Commission research publications
Tables	Annually: review the figures Main sources: Statistical yearbook of Greece, Statistics of Hellenic Ministry of Transport
Maps	Ad hoc: Redraw the maps according to changed situation. Main source: All the above
Trend graphs	Annually: review the graphs Main sources: Use of TRIPS model to update the data
WWW-links	Ad hoc/at least 4-5 times per year: Review the function and topicality of the existing links. Add relevant links, remove irrelevant ones.

New concepts	Ad-hoc: Use of new DSS concepts MAIN SOURCES: IN HOUSE DEVELOPMENT
New technologies	Ad-hoc: review of the Web site with new techniques (ARC/IMS, SQL server, Intranet) MAIN SOURCES: NEW MARKET TECHNOLOGIES

2.6.4. Organisation and business plan

Several issues have been examined: Current market Situation (market analysis, competition), opportunity and issues analysis (SWOT analysis, issues analysis), marketing strategy (Objectives, potential clients, sustainability). The expected customers of TEMO would be: Transport Operators, Consultant agencies, Government and interest groups, Public and private research Institutes, Academic Institutes. Estimated number of subscribers: 0.5% of population (50000); 65% of total demand concentrated in Athens area; First Year Demand: 5-10 expected clients.
The SWOT analysis showed that the key weakness to develop TEMO as a private service was the missing marketing experience, the public services weakness in high technology products, the limited availability of information Technology experts and the insufficient data.

The results of financial analysis are presented below. The financial results verify the strategic plan and organisational scenario analysis results which indicate the Public-Private-Partnership Scenario as the most attractive one.

	Year N	Year N+1	Year N+2
Observatory resources *(Investments from private partner)*	30000	20000	10000
Sales output *x unit price of output x frequency of publications*	48000	57600	69120
Subsidies *(from public partner)*	25000	25500	26000
Costs *(according to Business Plan)*	101230	101290	101950
Profit	1770	1810	3170

2.6.5. Conclusion and further work

The basic idea of the TEMO Web site is to provide information free of charge, public financing is required. Ultimately, it is up to those organisations to decide whether this kind of an information system is worth maintaining and developing.
The Observatory will be able to act as a non-profit organization (the status has not yet been defined after the Business Plan elaboration).

It will be able to provide direct information though Internet without any charge to the users at Frequently Asked Questions will also provide Tables, Reports, and Maps with an additional *Charge* to the customers.

The already identified further (at a later stage) development areas of the TEMO Web site are as follows:

- the area of scope should be expanded to cover the whole East Mediterranean Sea

- specific attention should be paid to monitoring the development in south-east European countries;
- feedback from potential users of the Web site should be collected systematically (for example by asking annually 50-100 transport experts, officials and decision makers to fill in a query on the Web site) to develop the Web site to meet the needs of the users;
- development of a “news directory” and “studies directory” should be considered to answer “what’s up” and “what if” questions regarding, for example, policy initiatives and public opinion;
- the Web site could be made bilingual (English / Greek) in order to facilitate a wider national discussion on transport policy issues.

2.7. CETMO Internet Service (West Mediterranean)

2.7.1. Geographic scope

The Western Mediterranean Observatory concerns the North-South relations in Western Mediterranean (Italy, France, Spain, Portugal, Tunisia, Algeria and Morocco) and has been developed jointly between ASSEMBLING (INRETS, the French National Institute for Transport and Safety Research - Department of Transport Economics and Sociology) and CETMO (Transport Study Centre for the Western Mediterranean).

It is important to mention that CETMO already exists and carries on permanent monitoring activities under the auspices of the Member States mentioned and United Nations. CETMO can be considered self-sustained because of this international involvement.

2.7.2. Objective

Because the geographical and political scope of this observatory is larger than that of the other ASSEMBLING Observatories, the Western Mediterranean has a more global view and very specific "fact and figures" oriented context.

Thus, in accordance with objectives of the observatory project and CETMO, namely impartiality and equity, all considered countries in the area have been analysed in a homogenous and neutral way. Therefore, some gaps in sources of information in the Maghreb countries have been compensated by providing an information synthesis concerning the Latin arc countries[1] and their harmonisation within the level and the availability degree in the Maghreb countries.

The Observatory and the web site are both situated at the CETMO, which is the one of most important institutions for the Western Mediterranean. A large number of Observatory objectives resulted from the main activity of the CETMO as a Pilot Transport Study Centre for the Western Mediterranean within strategic transport planning and decision-making initiatives for over ten years. Moreover, CETMO activities correspond closely to those of ASSEMBLING. In this order, the extensive experience of CETMO was currently applied during the setting up of the Observatory web site.

CETMO – *Centre d'Etudes des Transports pour la Méditerranée Occidentale* – was set up in 1985 through an agreement between the countries of the region, following the recommendations of the Conference of Transport Ministers of Mediterranean Countries, which was held in Salonika (Greece) under the auspices of the United Nations. During its 40th plenary session in July 1988, the Economic and Social Council of the United Nations approved Resolution 1988/169 to grant the CETMO, located in Barcelona (Spain), the Status of a United Nations Centre. CETMO works as a non-profit making body, financed mainly by the Spanish Ministry of Transport (*Ministerio de Fomento*) and the regional government of Catalonia. CETMO conducts its work in close co-operation with the National co-ordinators from the ministries of

[1] Latin arc countries: France, Italy, Portugal and Spain.

transport of the seven countries in the Western Mediterranean area (Algeria, France, Italy, Morocco, Portugal, Spain and Tunisia). Since the beginning of 1997, CETMO has also become the technical secretariat of the Transport Group of the Western Mediterranean (GTMO). The members of the GTMO are the transport ministers from the seven countries in the region.

The principal characteristics of the applied methodology have been derived from the NTO pilot work but also from the long-term policy-relevant knowledge and status of the CETMO at Western Mediterranean level. This is the main reason why all Observatory objectives have been closely linked to the fundamental mission of CETMO (*See section 1.2.2.*).

2.7.3. Information system and maintenance

The main CETMO databases (INFRA, FLUX, LEX and the new database ASE) are updated yearly (every two years for CETMO-INFRA and CETMO-FLUX), according to the work agreements of the most recent meeting of the national co-ordinators. These databases constitute an indispensable instrument for the transport knowledge in the Western Mediterranean.

CETMO-INFRA (Version 97.1): The infrastructure database for the Western Mediterranean countries is updated every two years and describes the main characteristics of transport networks (on GIS files), by mode and by section. The first revision to update the terrestrial infrastructures database in Western Mediterranean has already begun.

CETMO-FLUX (Version 97.1): The freight and passengers traffic database of the Western Mediterranean countries (by mode) is updated every two years (since 1987).

CETMO-LEX (Version 99.1): The LEX database contains a compilation of legislation on international transport in the Western Mediterranean. The selection of legislative documents covers the areas of the different transport modes (road, rail, maritime and air) as well as passenger and goods transport. The database includes European Union legislation as well as legislation of the seven countries in the area: Algeria, France, Italy, Morocco, Portugal, Spain and Tunisia. United Nations multilateral agreements are also included. CETMO has updated its LEX database every year since 1989. The series on legislation in Algeria, Italy and Tunisia contains data as from 1998.

CETMO-ASE (Version 99.1): The most recent database of CETMO includes a selection of general socio-economic information concerning international transport in the Western Mediterranean. CETMO-ASE contains data for each country in the area about: Population and labour market, economic activity, prices and money and external trade and international goods transport.

2.7.4. Organisation and business plan

The best choice to host the Western Mediterranean Observatory was at CETMO, which has a long experience, since 1985, as a regional capital and co-operation transport study centre between the Western Mediterranean countries. The National co-

ordinators from the ministries of transport of the seven countries in the Western Mediterranean area represented in the CETMO board members.

The incoming data is mainly obtained free of charge from these national co-ordinators and other international, national or regional institutions. The information availability and use of the Internet interactive service are unlimited and free.

Some external services such as participation in the thematic networks in the frame of the 5th Framework Programme could be integrated into the future monitoring activities.

2.7.5. Conclusion and further work

The future development and improvement of the Western Mediterranean Observatory web site seems necessary and indispensable. In this way, some development needs of the Western Mediterranean Observatory web site can be presented as follows:

- Particular attention should be paid to monitoring the development in the Maghreb countries;
- Feedbacks from usual and potential users of the web-site should be collected systematically in order to develop Internet tools in accordance with the needs of future users;
- Monitoring of research and study results should be developed to become a more comprehensive and more pertinent interactive tool (like the CETMO-LEX interactive tool)
- The Observatory directory exists only in English but the official CETMO web-site already proposes a trilingual (English / French/ Spanish) version and similar information, in order to facilitate a wider national and regional access concerning transport policy issues;
- Demonstrations of some of the above improvements and additions can be made to the Western Mediterranean Observatory web site until the end of ASSEMBLING project in May 2000.

In conclusion, the intention of Western Mediterranean Observatory was not to create a new institution but rather to make use of the huge amount of work produced so far by CETMO. This will allow the difficulties mentioned above to be overcome, through suitable improvements, made with a view to increasing North-South co-operation and interrelations, particularly in the light of forthcoming development on free trade relations in the Mediterranean area.

2.8. RGO Internet Service (Rhine Gateway)

2.8.1. Geographic scope: a “project-related” observatory

RGO covers the Betuwe line rail project linking the port of Rotterdam with its European hinterland throughout the Rhine. Because RGO pilot case analyses the feasibility and interest of monitoring the potential impacts of a specific project and the decision-making process leading to its approval, it is a highly politically sensitive case-study.

2.8.2. Objective

RGO did not develop an information system (data and information concerning the decision-making process in Netherlands was considered confidential) but carried out a detailed ex-ante analysis of the decision-making process and defined, based on this ex-ante analysis, how a specific infrastructure project such as the Betuwe line should be monitored. This includes a precise assessment of the information sources available and the need (and cost) to complement them by additional surveys.

Results from more than 100 forecast and evaluation ex-ante studies analysed by RGO showed that, despite the same data being used, results from assessments and forecasts were extremely different. Transport forecasts and investment costs have always been estimated in isolation and never brought into relation with each other. This fact has had important implications along in the evaluation process.

The information has two main uses. In the first place the information gives insight in the actual position of rail transport related to other modes of transport and other transport chains. Secondly it forms the basis for forecasts for future developments, which will form the framework for monitoring and evaluation. Monitoring and evaluation only make sense if a reference framework can be developed.

The nature of the output is strongly related to phase of the project. In the preparation phase forecasts are important. Transport on the Betuwe line does not exist, because the Betuwe line has not yet been constructed. This does not imply that no transport is taking place between regions that will be potentially served by the Betuwe line. On the base of the existing transport, autonomous growth and traffic generated by the construction of the Betuwe line and other supply side orientated measures, the future share of the Betuwe line in the transport on selected corridors can be estimated.
Transport forecasts on future transport volume have two main purposes. In the first place they are important for the costs and benefits of the infrastructure to be constructed. The forecasts determine to a certain extent the size (e.g. the number of tracks) of the proposed investment. The size of the project determines the scale of the necessary investments and the potential profitability of the line. This becomes particularly important if private capital is needed.

The second goal of transport forecasts is to form a base for evaluation. The results of the forecasts can be used to compare the actual level of traffic after the Betuwe line is constructed with the forecasts on which the decision to construct the line were based.

In practice, this is seldom done. An important reason is the large time discrepancy between plans and realisation. The time lag is more often than not a period of over 10 to 15 years.

RGO analysis demonstrated the interest of the policy-monitoring approach at European level proposed by ASSEMBLING.

2.8.3. Information system and maintenance

Statistics Netherlands is exactly 100 years old in 1999 and has compiled statistics on transport throughout its existence. Transport statistics on border crossing transport had, till recently, two main sources. The first source consists of the documents filled in at the border (custom documents). These documents are the basis for trade statistics. Transport statistics were derived from these documents. The advantages of this base are:

- The similar treatment of all modes of transport;
- The exact origin and destination of the goods is known (not the place of loading and unloading);
- It is possible to distinguish between import, export and transit flows;
- Value as well as weight information is known
- The number of products is large (very detailed classification)

The disadvantages are:

- The packing is not taken in account (especially a problem with containers)
- The geographical detail is restricted (mainly to country level)

Since 1992 the custom documents have no longer been available for movements within the countries of the European Union. While a lot of effort has been expended to fill in the gap, the results so far seem to be very poor compared to the information available prior to the change (see also the shipper information).

The second source is formed by the documents for the individual modes of transport. In these documents, place of loading and place of unloading is given. Furthermore the total weight transported (including weight of containers) is registered. The commodity is also given, but only at a broad level of detail. The composition of statistics requires basic documents as raw material. The documents needed for the statistics of freight transport are closely related with the mode of transport. Every mode of transport has its own documents, with similarities and differences. The shipment is, in the majority of the cases, the basic element of transport, together with the mode of transport. These two items (mode of transport and shipment) are essential for transport statistics[2].

The forecasts of the Betuwe line are mainly based on the data from customs documents. This explains in part the discussions between the Dutch railways and

[2] This means that transport chains can not be constructed in this way, because the mode of transport is the base element.

other organisations about the basic data. The railways (from their point of view rightly) argued that figures from customs data underestimated the total volume transported because the railways have to transport not only the goods but the containers and packaging as well. On the other hand, it is only possible to make adequate forecasts if import, export and transit can be distinguished. The background of these flows is completely different. Import and export is connected with the Dutch economy. The amount of transit transport depends on the economies of two countries outside the Netherlands (e.g. Germany and the United States). This was, together with reasons mentioned above, the reason for using this information. In recent years, it has become increasingly difficult to update this information because, as stated before, transport movements within the EU is no longer available on the basis of customs documents.

A last point of concern about this kinds of data is international comparability. Different countries use different classifications. And another difficult aspect could be that confidentiality of railway figures as railway operations move into the private sector. Even at the moment this already causes problems in studies on railways. The possibility exits that in future this will cause even more severe difficulties.

Another source of information are shippers. This information is a direct source and this is a main advantage. Other advantages are the possibility of obtaining chain information. The advantages of a continuing shipper survey are obvious. The information is very rich, transport chains can be followed together with the reasons behind the choice of the transport chain. The disadvantages are the high costs which result because the collection of information is very labour intensive and therefore very expensive business. One important problem is non-response. A typical survey may have, depending on the number of pages, a response ratio of 25 to 50%. In the case of the Rhine gateway observatory it is advisable to involve the potential information donating companies in an early stage. The response rate will be substantially higher if companies can themselves benefit from the information.

Given the poor quality of the data based on customs information and the efforts put in constructing origin destination chains on the basis of shippers information, the information from companies involved in transport on the Rhine corridor seems indispensable. Perhaps it is even necessary to go one step further and involve potential users of the Betuwe line as early as possible.

2.8.4. Organisation and business plan

RGO organisation has to be necessarily European and, ideally, the national administration has to be also involved. Needless to say, the political sensitivity of a Member State being "audited" by European institutions will overcome only with difficulty.

The actual updating of the RGO Web site (first dimension) does not require more than 2-3 man-weeks per annum. On the other hand, the maintenance is a continuous task for one person (second dimension). That person should have "antennae" to receive and "filters" to select news, research results, data updates, etc. that are relevant to strategic transport policy questions. This second dimension of maintenance will require another 2-3 man-weeks per annum. There is a need for the contribution of a top-level "expert", which can be estimated (monthly memos) as 2 man-months.
The data to be collected depend of course on the desired contents of the output. The two main sources for information are statistical offices from individual countries and the EU and direct information from shippers (and possibly operators and agents involved in transport). In principle a large number of stakeholders might be interested in the results of monitoring. The most important groups of potential clients seem to be:

- Users of the Betuwe line
- Government related organisations
- Investors

Before going into detail about the reasons why they may be interested, it is important to define what information is important. Users of the Betuwe line may be especially interested in operational information. Questions are: What transport chains are used? Which chains are competing, what are the costs involved using these chains? Or what is the reliability of these chains (transit times, delays etc.)?. Companies are interested in market information (how is the transport market changing), methods of reducing costs, information about competitors and increasing performance. The information should be quickly available. On the other hand information about future developments should not exceed a period of 5 years. Most companies are not interested in the longer run.

Government related organisations (like audit offices) are probably more interested in:

- How was the decision making process organised?
- How is actual performance against forecasted performance?
- How can the future decision making improved (made transparent)?

This will be mainly true for controlling institutions like the Dutch Audit office (Rekenkamer), or European audit offices. Other controlling bodies like the parliament could also be interested. Mainly because they have always been rather critical about the decision making process.
One should however make a difference for the different goals involved in politics. In the case of the Betuwe line the following goals are important: Are the investment costs in line with the planned costs?. The experience is that large infrastructure projects tend to become more expensive than planned.

In recent years the discussions about private participation have got more attention. Especially for projects like the second Maasvlakte and roads. In the plans for the Betuwe line it was initially assumed that private parties would finance a part of the investment costs. For this reason investors (especially financial institutions like ABN AMRO and ING) could be interested in results from exploitation of the Betuwe line.

The financial aspects can be divided in a number of aspects. In the first phase of the Rhine gateway observatory, initial investments have to be made to set up the observatory. After this stage is passed, the costs of maintaining the observatory have to be calculated. A second division is between costs and revenues. The costs can furthermore be divided in initial costs, operational costs and costs for gathering and processing the data. But before estimates about costs can be made, a number of questions from the foregoing discussions have to be answered.

The first question is whether the observatory should be set up in isolations (as an independent institute) or in co-operation with existing institutions (e.g. "Connect"). The most elegant solution seems to be an independent institute in the same building as other institutes in the field of transport. In this way, the new body can profit from the infrastructure of the other institutions (computer networks, library, and databases). On the other hand, is independence an important condition for the functioning of the observatory?

The staff could consist of two persons. One mainly directed at data collecting, computing and analysing, the second person more directed at writing reports and external contacts. The supporting staff could be a secretary and, depending on the workload, one or two temporary helpers (students). The costs of accommodation are unknown. This will depend more or less on the form chosen. The costs of staff will be about Euros150.000 yearly. In additional, there will be costs for computer and communication equipment.

A second question is related to the collecting of information because setting up a shippers' survey to collect information on transport chains seems inevitable. It is not known at the moment whether it is possible to become take advantage of already existing shippers' surveys. A completely new shippers' survey would be very expensive, especially as it would have to be undertaken at least once a year. One possibility is a comprehensive survey at the start with smaller surveys in subsequent years. The costs involved in a survey depend on the way they are carried out. Written questionnaires are relatively cheap but need a lot of attention afterwards (non-response analysis, interpretation of answers, obvious mistakes etc.). Personal interviews are more expensive, but have the advantage of better data quality and a higher rate of response. Of course other possibilities exist (telephone surveys, or via e-mail or fax).

The second part is the number of companies to be questioned. In a real RGO, a rough estimate, based on the number of companies in the Netherlands), is that about 200 hundred large companies should be involved (in the Netherlands, Germany, Switzerland Austria and Italy). The costs of setting up this information base would be about Euro 60 000, on the basis of face-to-face interviews with about 200 shippers, including tryouts and analysis. The yearly costs, after these initial interviews, would

be about Euro 20.000 yearly. The costs of collecting other information, from the statistical offices, are estimated at about Euro 5.000 per year.

The revenues would come from selling information to interested parties. If about 10 parties could be recruited, with a contribution of Euro 5.000 per year, the total revenues per year could be about Euro 50.000 from RGO participants. Other sources of income could be newsletters, conferences, and publications of study results. It is very hard to estimate the revenues. Perhaps Euro 20.000 a year is feasible.

The costs can be broken down to initial costs (first year: Euro 235.000) and yearly costs (after year one, Euro 112.000). The revenues will come after the first year. This is only a very rough estimation, mainly based on past experience with comparable projects. The error margins however may not be negligible.

2.8.5. Conclusion and further work

The development of a European monitoring observatory focused on a specific infrastructure project raises important political problems, especially if the information system aims to cover both the decision-making process and the impacts. All relevant questions to be monitored are highly sensitive at this level: who provided the data and what is the quality of the data, what forecast models were applied and why results were different and contradictory, what evaluation models were applied and how were impacts estimated and, finally, how much would this effort help to improve the design of the actual project and its management strategies. If the conclusions of the in-depth analysis made of an infrastructure project developed by a single country with relatively good data availability and transport planning expertise are highly controversial, it can be assumed that this will also happen in most other cases.

Therefore, it seems more reasonable to adopt a regional coverage for all European observatories as a whole network, and applying a “project” coverage only for specific large trans-European infrastructure projects such as Essen Priority projects.

2.9. Definition of European Thematic Observatories and development of a pilot-case

2.9.1. Definition of European Thematic Observatory

Complementary to the regional-based or project-based, ASSEMBLING proposes to develop observatories at European level, focusing on providing selected indicators for key sectors. Within the ASSEMBLING project, the World Conservation Monitoring Centre (WCMC) has developed a set of environmental indicators of transport infrastructure and presented them in a website harmonised within the ASSEMBLING Internet Service.

In additional to these environmental thematic observatory, ASSEMBLING has contributed to the development of the website of SPESP (Study Programme on European Spatial Planning) for DG REGIO, including a number of studies and spatial development indicators. SPESP is considered the starting point for what can be the so-called "European Spatial Planning Observatory Network" (ESPON). This website includes interactive mapping facilities through Internet.

Other existing thematic observatories are, for instance, the Urban Observatory (accessible though inforegio, DG REGIO website), or the ones independently developed by transport associations such as the EIA (European Intermodal Associations), the ARC (Airport Region Conference) and others that have been included in ASSEMBLING Directory of Observatories and Information Sources.

2.9.2. WCMC Environmental Observatory: Key indicators

ASSEMBLING WCMC indicators cover green issues on two levels, the first within large scale natural ecosystems and landscapes (for example forest or wetlands). Secondly, it focuses on key sites of special importance for biodiversity. These include sites that have been recognised and designated both nationally and internationally, in addition to others that are listed in specific studies but without official designation.

The aim of these indicators is investigating the spatial impacts of transport policies and projects in Europe. The tool will enable study of these effects on diverse natural biomes ranging from populations of particular species to large-scale ecosystems in areas spreading from those of high urban, industrial or agricultural transformation to rare, remote and relatively intact wildernesses.

Preliminary studies conducted in particular by BirdLife International, the Royal Society for the Protection of Birds (RSPB), the World Conservation Monitoring Centre (WCMC) and the World Wide Fund for Nature (WWF) highlighted the significance of the current impacts of the Transport Network on the environment and biodiversity in particular. These impacts are potentially very serious and increasing problems can be foreseen in the near future (Bina *et al* 1995; Bina *et al* 1997; Fergusson *et al* 1994)

One of the major problems which occurs when incorporating biodiversity or "green" issues into Strategic Environmental Assessment (SEA) is the lack of measurable

parameters, either quantitative or qualitative, applicable for comparison of the current situation among different parts of Europe at local, national or regional scales. Combined with this, the resolution and temporal accuracy of available data has implications for the accuracy of analysis and therefore the validity of results.

For the pilot study three existing datasets were used to create a set of Key Biodiversity Sites:

- Nationally designated protected areas (IUCN categories I-VI)
- Internationally recognised Ramsar Sites (protected under *Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar*)
- Important Bird Areas, as sites of special scientific value for birds at differing stages in their life cycle (breeding, wintering, etc.).

In addition to these Key Biodiversity Sites, an indicator combining all forest types was used for the analysis. In the future more data from official, scientific and non-governmental sources on implemented and ongoing conservation initiatives will provide a more accurate background for SEA.

The resolution of datasets and inability to locate new or upgraded infrastructure on the digitised maps has important implications for the degree of accuracy of the analysis. The type of impact on the environment can vary considerably according to whether infrastructure development is new or upgraded. It is less important at this preliminary stage to identify these problems, but it might become the major constraint when the practical application of indicators is required.
The study accepts this limitation to the methodology applied. Access to the up-to-date digital data on the status of road networks in Europe is not established yet.

2.9.3. Spatial Analysis of the European Transport Network

At the initial stage of analysis, an estimation of the distribution of the land in Europe by distance from closest urbanised or populated areas presented on DCW was attempted. It provides a basis for interpretation of impacts of the Transport Network as an important, but not necessarily major factor within densely populated areas. Due to the resolution of DCW, small villages do not appear and are therefore ignored in the analysis. This however would have minimal effects on the distribution of potential impacts on the environment. Although it may become more important in the future through processes such as counter-urbanisation and relocation of industry.
Additional data on the location of 829,570 km of European roads and 314,046 km of railroads changed the distribution described above and is presented in the graphics (fig 2). The most remote areas of Europe are found mostly within the mountain and tundra regions of Sweden, Norway and Finland.
European forest cover compiled for this study has an estimated total extent of 1,698,871 km^2. It is interesting to note the distribution of forests do not follow the distribution of land shown in table 2, with a lower percentage in areas closer to the Transport Network. This reflects the increased felling of trees in areas where forest is more accessible.
The available data on the location and extent (as proportional circles where boundary information is unavailable) of 9130 sites identified as nationally and internationally

designated protected areas, Ramsar sites and Important Bird Areas were used to generate a layer that can be described as Key Biodiversity Sites (KBS). The total area of this integrated layer is 464,063 km^2. This total area statistic was created using a 'spatial join' which is not equal to the actual area of land covered by all the PAs. In many cases, areas have more than one protected area designation and as such will be counted more than once in the spatial join. By directly summarising the statistical data on KBS, an overestimation of the extent of the protected areas system is unavoidable for almost any country. It was also impossible to eliminate uncertainties arising from the lack of boundary data in addition to substitution of the PA maps with the proportional circles generated at this stage. Nevertheless, for the purpose of analysis of relatively big territories, this method is widely applied and does not create significant statistical errors.

2.9.4. Biodiversity Value Assessment Indicators

As shown above it is possible to assess the potential impacts of the Transport Network on sites or habitats, this can be assessed by country or other subdivisions to provide a comparative analysis of different spatial units. This is a very crude measure of potential impacts as they depend on more parameters than solely distance. The sensitivity of individual species to potential impacts can be relatively well defined to a certain level. However, the impacts on the whole natural complex are a relatively smooth function of distances away from the Transport Network, because many individual features of the biodiversity of an area are involved.

2.9.5. Current website layout and potential developments

At present, all the analysis presented above has been placed on the web at www.wcmc.org.uk/assessments/assembling/. Included in this are maps showing the overall study area as well as others for each of the individual observatories in increased detail.
Each type of map listed below is shown for both the whole study area as well as each individual observatory area.

- Observatory Area
- Distribution of Land by Distance from Populated Places
- Road and Rail Network incorporated into the Analysis
- Distribution of Land by Distance from Roads and Railroads
- Forest Cover
- Forest Cover Classified by Distance from the Transport Network
- Location of Key Biodiversity Sites
- KBS and Distances of Site's Territory from the Transport Network
- Country Scores by R_{bdv} Indicator Applied to KBS
- Forest Cover by Distance from the Transport Network (Germany only)
- Administrative Unit Scores by R_{bdv} Indicator applied to Forest Cover (Germany only).

The website also includes this report along with links to the other observatories.

2.10. ASSEMBLING Internet Service

2.10.1. Definition of policy-Information Service

The goal of ASSEMBLING was the development of an integrated policy information service for European policy-analysts, providing adequate answer to:

- "*What's up?*" (so "informing" users on the evolution of key policy problems)
- "*What if...?*" (so helping users to become more "knowledgeable" to understand the potential impacts of their policy actions).

Information (assembled from the network of observatories) can be provided as data, tables, graphics, hyperlinks to relevant sources and expert opinions or press releases. But the knowledge required to answer What if...? questions cannot be provided just by the information assembled from the observatories.

Knowledge acquisition requires a learning process (which usually takes years of living the experience of confronting his expectations against reality). Computerised models, *because they simulate to some extend the behaviour of reality*, may facilitate a learning process if users can define policy decisions and get back the impacts forecasted by the model in a user-friendly and interactive manner. The contribution of ASSEMBLING to this research challenge has been to make interactive and to develop user-friendly interfaces for some advanced models.

Needless to say, before discussing how knowledge-tools and information can be provided to answer the two fundamental type of policy-questions (What's up? and Why if...?), the first problem is related to the clarification of policy goals, aims and actions, in other words, listing which policy questions are related.

Next table provides a first approach to clarify European transport goals, aims and actions:

Policy goals	**Policy aims**	**Policy actions**
Economic and technologic competitiveness	Promoting Economic growth Inducing Market efficiency Assuring Fair competition Supporting technologic development More balanced spatial development Legal harmonisation	Legal regulations (deregulation, liberalisation) Planning documents (TETNs, Europe 2000+, Towards Sustainability)
Social and political cohesion	Protecting natural biodiversity Renewing resources Improving environmental quality	Investment programmes (loans to specific infrastructure projects)
Environmental Sustainability	Increasing human safety	Subsidies

Transport policy aims can be broadly speaking be clustered into two groups:

- *Policies aiming to solve continental problems*, typically network-related rather than geographical-related (e.g. integration and interoperability of rail

networks). These policies have to be assessed from a continental-scale, but have important local impacts (e.g. extension of major terminals).

- *Policies aiming to solve local problems which are common to many European areas* and have major continental or even global impacts (e.g. urban traffic as major responsible for CO2 emissions). These policies need to be assessed mostly by local expertise, but some guidance and harmonisation maybe needed

The following list of top 15 European transport policy aims has been obtained from a detailed scrutiny of official documents:

- Reducing the environmental impacts of transport (e.g. CO2 emissions)
- Efficient use of existing road and airport transport capacity (e.g. intelligent traffic management)
- Improvement environmentally friendly modes (rail, short-sea shipping, combined transport)
- Fair pricing policies for long-distance trips (e.g. road pricing policies) internalising external costs
- Market liberalisation and privatisation to stimulate fair competition
- Construction of TEN missing links with higher European priority
- Extension of TEN to third countries
- Removing intermodal bottlenecks
- Integration and interoperability of networks (specially for the rail network)
- Improvement of local and regional connections to TENs
- Improving transport safety
- Reducing regional transport endowment gaps
- Financing new infrastructure: New forms of public/private partnership
- Reducing subsidiarity conflicts

A second major problem is expressing rather abstract political goals and aims into concrete quantitative figures representing their accomplishment levels (so policy-meaningful "indicators"). *An ideal indicator of policy effectiveness should measure both the costs and benefits attached to a given policy, according to a scientifically consistent formulation and supported by reliable data.* Being this goal unfeasible in many cases (because of lack of data, lack of precise knowledge of the system, lack of available forecast models) indicators should at least be able to highlight key issues, be scientifically consistent, and totally transparent.
Next table provides a summary of key criteria used to select ASSEMBLING policy indicators:

Policy relevance	**Direct relation to specific policies**
Scientific consistency	The models producing the indicators have to be scientifically reliable (objective)
Sensitive to policy actions	Indicators should highlight the impacts of policies, in terms of goal achievement
Meaningful to policy makers	Indicators have to be transparent, easy-to-understand and communicate by policy-makers.
Applicable	Data and models needed to compute the indicator must be available

The third problem is being able to model the impact of different policy aims on the indicators measuring accomplishment of aims and goals. The experience of the 4th European Framework Programme modelling projects (e.g. ASTRA, STREAMS.) has been used as reference. ASSEMBLING did develop new forecast and backcast models, but they were based on the know-how and methodologies of the already existing ones (outputs from existing models were used as benchmarks to validate results from the new ASSEMBLING models).

2.10.2. Structure of ASSEMBLING Internet Service

The structure ASSEMBLING Internet Service is organised according to reflect the most frequent user queries:

- Updated information concerning the needs and impacts of current European transport policies across the European territory (What's up?)
- Interactive knowledge-tools (based on external forecast models) to help users to understand the impacts of alternative future transport policies ("What if?" questions).

What if?

What's up?

What's up at regional level?

(Needs and impacts of European transport policy actions)

To monitor needs and impacts of policies (Where are we now?), ASSEMBLING has "assembled" information at European level and developed a pilot network of European Transport Regional Observatories covering various European zones:

Nordic Triangle

Pyrenees

Rhine Gateway

East Mediterranean

West Mediterranean

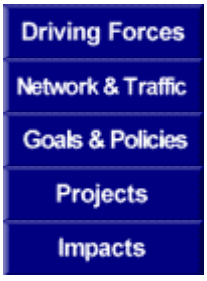
ASSEMBLING has developed and helped to organise European Thematic Observatories specialised on producing key indicators to assess the environmental impacts of transport infrastructure.

Environmental
WCMC

Directory of Observatories and other information sources
Providers
Products

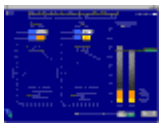
What's up at European level?

The information is provided at European level for transport (based on EC DGTREN and a number of EU research projects such as SCENARIOS, POSSUM, TENASSES) and closely related fields such as environment and spatial development; at regional level (five pilot observatories were developed and linked to the system). The information is organised in a number of sections (Driving forces, Networks and traffic, Goals and policies, Projects and Impacts), following the same layout as the regional monitoring websites.



What if this European policy action was taken?

The knowledge-tools include on-line access to interactive transport models helping to explore strategic policy questions (e.g. impacts of alternative policies to meet the Kyoto targets, impact of migration policies on transport growth). There is an economic model available (based on ASTRA), a traffic forecast model (based on Bridges/NIS software) and a number of more specialised tools to analyse specific policy questions.



Will EU meet Kyoto's CO2 reductions?
Demand questions (Dynamic System Model)
Network questions (Sequential Four Steps Model)

All components are accessible through the Internet and in most cases they are Internet applications. In few cases (e.g. some policy-specialised tools), the tools have to be downloaded from the Internet. Each one has its own user-interface (accessible from the European Central Website, ECW) and user-interfaces follow harmonised structures and layouts.

2.11. What's up?: ASSEMBLING European Information

A Central ASSEMBLING Website (CW) has been designed to include information concerning European transport policies following the same structure of the regional observatories. It is also the main gateway to ASSEMBLING Information Service.

The main modules are:

- A user-friendly and self-explanatory web interface, providing the user with basic capabilities (access to EU policy documents, access to abstracts from studies, and access to key data –e.g. Statistic Pocket Book)
- Links to ASSEMBLING knowledge-tools, with a description, default values for parameters open to users (representing policy actions or exogenous scenarios), and any other metadata documentation. Both forecast models and evaluation methods are included.
- Links to ASSEMBLING thematic observatories
- Links to ASSEMBLING network of regional or project-based observatories (websites)
- Link to ASSEMBLING Directory of Observatories and Information Sources
- Links and hyperlinks to other relevant websites

This service aims to provide executive information in relation to needs for and impacts of European transport policies across the European territory. It follows the same structure and layout as the observatories websites.

2.11.1. Driving forces

Policies aim to guide the evolution of society to satisfy pre-determined goals (e.g. growth, cohesion, sustainability). In order to do so, it becomes indispensable to anticipate the spontaneous evolution of those forces driving society, as well as their interdependencies. Scenarios have been developed by assembling compatible trends in all relevant social, economic and technologic driving forces. Therefore, the identification of realistic trends for these driving forces and the definition of consistent scenarios, is a crucial component of ASSEMBLING executive support-system.
The production of these "assembled" scenarios was not part of the ASSEMBLING research. They are based on previous research projects, especially:

- "Scenarios", co-ordinated by INRETS in the 4th European Research Programme supervised by DG TREN
- TENASSES, co-ordinated by ICCR in the 4th European Research Programme supervised by DG TREN
- Chapter 2.1 "Main trends of the European Territory" developed within the Study Programme in European Spatial Planning (SPESP), launched in 1998, under the auspices of the Committee of Spatial Development of member states of the European Union and funded by the EU and member states), and co-ordinated by a pilot group led by Nordregio, with Mcrit participation.
- Other official documents from DG TREN, DG REGIO and the European Environmental Agency.

The analysis takes as a starting point the major shifts in geo-political position and economic organisation that Europe experienced during the twentieth century as noted in SPESP. This has been accompanied by major social and cultural transformations, as well as widespread changes in landscape and bio-systems. There are many accounts of global and European economic change. Analysts often use rather crude polarities to express the changes, especially those between mid-century and the present: industrial/post-industrial, fordist/postfordist, modernist/post-modernist, welfare state/post-welfare (de-regulation), cold war/post-communism, etc. There is a widespread recognition that Europe is positioned economically and geo-politically very differently than in previous historical periods. The result within Europe is that different areas are affected by different combinations of these trends, operating at different speeds. For example, while rural depopulation is still a marked tendency in many parts of Europe, in other areas, urban population from metropolitan cores is spreading out ever more widely, both within the same territory, and often to attractive niche locations well beyond.

Driving forces include:

- Demography
- Human assets
- Technology winks
- Economic growth
- Spatial patterns
- Mobility
- Environmental resources
- Environmental impacts
- Government role
- European Integration
- Synthesis of main trends
- European scenarios and world scenarios

Tables with relevant data and forecasts for all of these fields are provided. Based on this information (D2) and that provided by the different observatories (D3-D7), an integrated knowledge-tool (based on D8 experience) has been developed as part of D9 (demonstration of the integration of monitoring information within an executive European policy Information System).

2.11.2. Network and traffic

This section includes maps showing traffic levels from United Nations surveys (carried out by the Institute of Territorial Studies, IET) as well as basic maps and figures of the existing situation in terms of transport endowment.
An interactive GIS application also provides free access to transport networks and users can select between different maps (road, rail), geographic views (by country, regions), zoom and retrieve attached data by selecting objects in the map. This is prepared for the whole EU.

For the Phare countries, a similar GIS interface has been developed based on the forecast study made by NEA et al. For DG TREN (1999).

2.11.3. Goals and policies

The main goals for Europe could be summarised into:

- Economic and technologic competitiveness
- Social, territorial and political cohesion
- Environmental sustainability

The policies to achieve these prime objectives and the specific type of actions related to them are shown in the following table. Policy actions are listed according to the main treaties between Member States and the principle of subsidiarity.
The CW provides information and links in relation to goals, aims and actions, specially "assembled" to give a synthetic overview of the whole political process. For instance, milestones of the Transport Common Policy are presented in the context of main Community Treaties, and current policy actions are classified by aims. This classifications are then used to code news and information.

2.11.4. Projects

This section provides information concerning TENs and Essen Priority Projects. All official maps of TENs and network extensions are included.

2.11.5. Impacts

This section provides information concerning spatial development impacts based on the UTS Study (Union's Territorial Strategies linked to TENs, Mcrit DG7, 1996).
Information concerning the overall environmental impacts of TENs (Strategic Environmental Impacts) is planned to be included (in co-operation with WP8 and the WCMC thematic observatory specialised on environmental and land-use impacts).

2.11.6. Infrastructure databases: ASSEMBLING Graphs

Two set of graphs have been developed to support transport infrastructure databases:

- A graph of road and rail corridors (with NUTSII administrative centres as centroids), called "Simplified"
- A detailed graph (with NUTSIII administrative centres and many municipalities as nodes), called "ASSEMBLING"

Both graphs share the same topology and are interconnected. The following table compares the simplified graph of corridors (useful for traffic assignment at EU scale) with the ASSEMBLING complete graph (useful for data handling). Bridges/NIS assures automatic transfer of data attached to both graphs.
The graph covers EU countries and Eastern European countries including Russia, as well as North Africa and the Middle East.
They include regional and national networks (roads, rail, ports, airports, inland waterways), as well as urban networks (modelled from 1:10.000 scale maps) for all important cities. Rail stations, sea and inland ports, motorway entrances, airports are represented as nodes and connected to city nodes by specific road and rail connectors. All NUTS III, II, I and 0 are attached, as well as other small cities down to NUTSIV

level. At a cartographic level, NUTS III zones, mountains, rivers, protected areas (partially validated) are included.
The graphs were developed by Mcrit, co-financed by ASSEMBLING research, between 1997-2000. UTS graphs (1994-1996) were considered as starting point, and a number of studies conducted with INRETS (Paris) for the extension of Trans-European Networks (INFRAMED, CORRIMED) helped to update and improve them.

Technical characteristics of the ASSEMBLING graphs of Europe

			Graph SIMPLIFIED		Graph ASSEMBLING	
			Types of elements	Number of elements	Types of elements	Number of elements (*)
Links	Rail + Connectors		1	2291 + 692	10	18401
	Road		1	1528	10	101385
	Inland Waterways		1	158	4	158
	Maritime lines + Connectors		1	178 + 180	4	1192
	Air Lines		0	0	4	(Autom.)
Nodes	Cities	NUTS 0	1	56	1	56
		NUTS I	1	130	1	130
		NUTS II	1	675	1	675
		NUTS III	1	1327	1	1327
		Other cities	0	0	3	10198
	Transport Nodes	Sea Ports	2	180	4	833
		Inland Ports	1	30	4	30
		Airports	0	0	4	747
		Railway Stations	2	692	5	8623
	Other nodes	Alpine Crossing Points	1	15	1	14

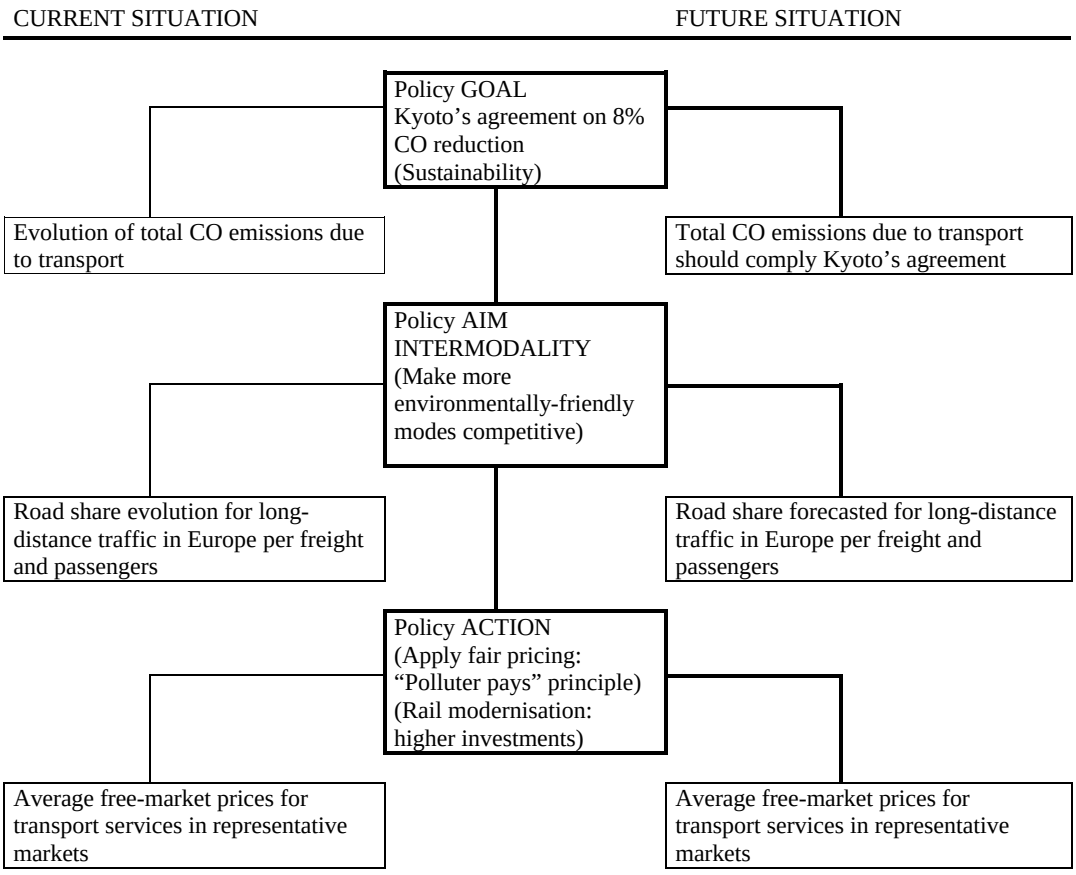
(*) Intersections between roads, rail, waterways and with boundaries not included

2.12. What if...?: ASSEMBLING Knowledge-tools

2.12.1. Definition of a knowledge-tool

Knowledge-tools are, basically, computer tools made by linking remote advanced backcast and forecast models to user-friendly interfaces. The knowledge-interface is designed to help users to explore a particular policy problem (e.g. is the EU going to meet its Kyoto CO2 targets?). The user can change the values of variables reflecting policy actions (e.g. more strict standards for vehicle emissions) and visualise their impacts (e.g. total CO2 emissions) interactively. On-line interaction is fundamental allowing users to learn by comparing their intuitive understanding with the outputs provided by the model. The merit of a knowledge-tool is precisely this: by interfacing end-users and models in this way, the models (or results pre-calculated with models, or simplified but still policy-meaningful versions of models) become effective learning tools.

The next table provides a sample of a knowledge-tool, as they have been defined:



2.12.2. Policy-specialised knowledge-tools

A number of knowledge-tools have being developed to explore the potential impacts of alternative future policies in relation to the following main questions:

- Energy sources: Diversification opportunities to comply with Kyoto
- Urban transport policies: environmental impact of local traffic
- Improving the transport safety record
- Diversion of road traffic to rail and short-sea shipping
- Intelligent traffic management to reduce road and air congestion and improve safety
- Construction of Trans-European Road Networks to reduce bottlenecks and link third countries
- Integration and interoperability of rail networks

To illustrate the purpose and methodology of the knowledge-tools, the one developed to analyse the feasibility to meet Kyoto's CO2 reduction is presented here.

The knowledge-tool starts with an overall policy question: Will Kyoto's 8% CO2 reduction 1990-2012 be achieved?. It then proposes a basic statement, in a text format, following the typical structure of a media news item. In the case of the Kyoto target:

*"It is unlikely that the transport sector (that represented 24% of CO2 emissions in 1990) will reduce its emissions by 2012 as required by Kyoto's agreement. If the economy keeps growing and **induces additional traffic** as is usual, and **road** keeps its share, the transport sector in 2012 will generate more CO2, even if the **efficiency of vehicles** improves significantly. All considered, transport increases may offset the CO2 reductions in energy and other sectors, leaving the total CO2 emissions for 2012 at the same level as 1990 or even higher (in this scenario the transport sector will represent more than the 35% of total CO2 emissions)".*

The overall statement is divided into sub-statements (underlined) and each one has a hyperlink to a new web page where the user can fix a number of variables (e.g. growth of GDP in relation to "*if the economy keeps growing*", GDP/traffic elasticity's for passengers and freight in relation to "*and induces additional traffic*"). The user is shown interactively the impact of such changes on the total level of CO2 emissions.

The Kyoto's know-tool, as presented, is a kind of backcast model, since the overall policy goal (meeting the Kyoto target) is the starting point and the user explores under which scenarios this could be feasible; the same methodology can be applied for forecast models, conceptual models or any other kind of modelling tool. In fact, the "knowledge-tool" can be understood as the "policy-interface" to any modelling or information system.

2.12.3. Strategic knowledge-tools

A sample of an "strategic knowledge-tool" covering demographics, socieconomic, transport and environmental forecast (being in itself an starting point for a comprehensive "knowledge-system") has been developed to provide for key policy

indicators under different policy scenarios to be defined by the user. The basis of this strategic knowledge-tool is the model that comprises a transport system together with socio-economic elements. The modelling approach chosen follows the principles developed by system dynamic methods, which are described below. The model is designed to make a flexible alteration of particular parameters and functions easily possible. Thus each model run represents the response to individually determined scenarios.

During model runs, users observe indicators in relation to the attainment of objectives. By repeating this procedure, users have the possibility to develop a policy program that comprises concrete transport economic tools and supporting measures. Because of the holistic approach of the model, which takes interrelations into account, it is possible to take a much broader view. As a result of avoiding a restricted view of only one part of economy, the selection of policy instruments fulfil the wider requirements of comprehensive economic policy advice. With the finalisation of the knowledge-tool interface it should be possible to learn something about the accelerating or damping effects of policy applications within a specified framework of expectations of future developments.

In this context, it is important to know that users are not left entirely to their own devices in choosing the parameters. Some default values are set, which reflect some "normal" course of development derived from trend-calculations. Each parameter set chosen by users is checked and messages are displayed if the parameter setting seems to be unrealistic. As a result, the users must be able to defend their chosen settings but they still retain the opportunity to run the model the way they like. Of course, leaving the values might unchanged runs the trend - scenario; so users are not forced into taking a view about future developments.

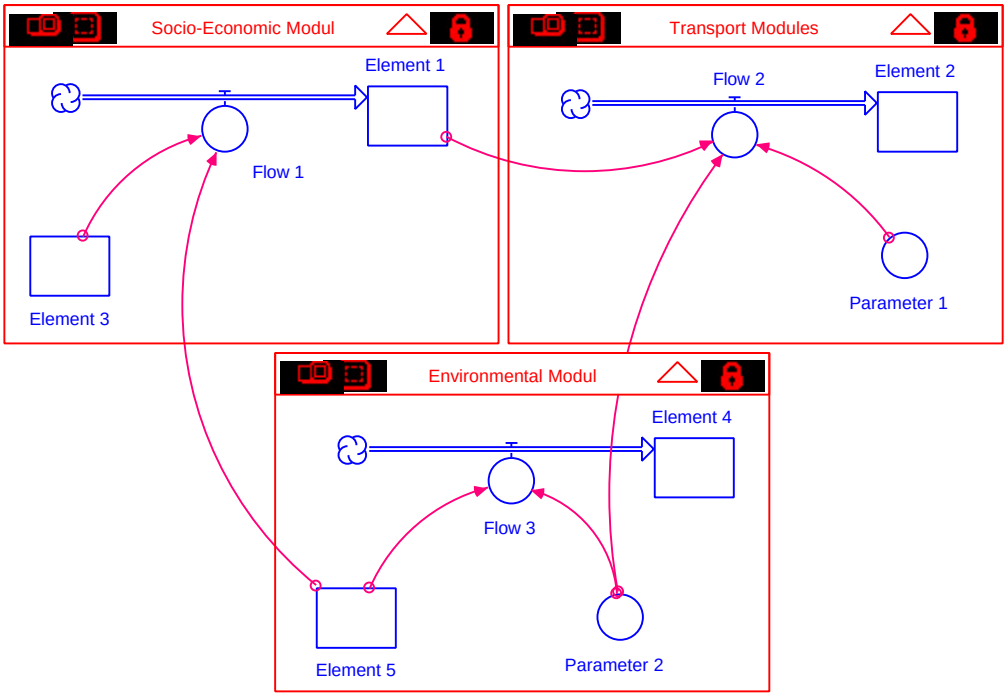
It is important to know that users cannot produce any result they want. They cannot change basic economic processes, which are reflected in the model mechanism nor can they change fundamental economic interrelations. Of course, within these boundaries imposed by basic intrinsic mechanisms, they can produce the results they want to some degree. But the chief aim of this kind of learning tool is not simply an output of numbers. Its main purpose is to provide information about developments over time under specified circumstances and frameworks. This approach is much more a qualitative view of the economic processes because it takes quantitative results as indicators to be observed during the whole course of simulation. In this context, another important point must be stressed: the interface makes all the assumptions visible. Thus users have the opportunity to discuss the underlying assumptions and results during the political process of instrument choice. Politicians are assisted by giving them the opportunity to find those policy instruments (concrete tools and supporting measures), that are particularly able to meet their objectives.

2.12.4. The underlying Model

System Dynamics is the underlying approach of the model finally chosen for the Executive Support System. This model is a result of an integration of different system dynamics models developed by IWW for several projects[3]. The central concept of

[3] SCENES; ASTRA

system dynamics is the integration of multiple elements into a system of interlinks. The interactions between these system-elements are observed during a period of time. Here, a system is defined as a closed set of elements, which influence each other by well-defined functional rules. The system is completely determined by the choice of elements and specification of their interlinks. The status of the elements at a given time represents the system as a whole. The following picture shows the basic principles of the system dynamics approach.



The Elements are alternated in each time-step by positive or negative inflows, which are calculated from parameters or the other elements of the system. The elements are indicators like population, employment, economic growth, CO_2 or transport volumes, for instance. The flows are the alteration rates generated by system-values interlinked at a current time-step. Parameters can be constants, auxiliaries, parameters set by users, time-dependent functions etc. Thus an overall system is generated which can give us some insight into interdependencies between socio-economic, transport and environmental developments.

The system elements are iteratively calculated at each time step by Euler or Runge-Kutta numerical methods. The status of the system depends on the system of the forgone time period. Each element is calculated in a defined order and the iteration steps are repeated until the end of the time period specified by users of the tool.

In more formal terms

$$E_j^t = E_j^{t-dt} + F_j^t \cdot dt$$

$$F_j^t = \sum_i g_j^i(E_i^{t-dt}) + \sum_k f_j^k(P_k^{t-dt}) \qquad i \neq j;\ \text{if } g_j, f_j \text{ exist}$$

where:

E,P	Status of an element or parameter respectively
F	Flow-Value
g_j	j-specific Function of E_i
f_j	j-specific Function of P_k
t	current time period
t-dt	previous time period
dt	step of iteration ≈ time step
j,i,k	indices of elements or parameters

Each element is calculated in a defined order and the iteration steps are repeated until the end of the time period specified by the user of the model. The j-specific function mainly represents the degree of influence a parameter or other element has in relation to the element j but it can be any other meaningful function, like a delay-function, for instance. The parameters/functions are mainly calibrated by backcasting approaches.

The model output consists out of a set of time-dependent indicator trajectories. This is real strength of the approach: users can observe parallel developments of indicators, their mutual dependencies and side effects. This model is best for long and medium term forecasts and it focuses more on interdependencies within a system and less on the details of only parts of the system. In this sense it is much more a "qualitative" forecasting approach.

When users apply the model, the underlying program employs standard numerical methods[4] to solve the system of equations that comprise the model. The resulting indicator trajectories show the idealised behaviour of "real world" interrelations as sketched in the model. A set of discrete calculations is used to approximate the idealized curves of the indicators during time(t). The time axis is divided into equally spaced intervals, each with a width of "delta time" (dt). The calculations are performed at discrete intervals. The equations behind the model elements are known as "Finite Difference Equations". Thus the structure of the model and the iteration method chosen is of vital importance for the calculation.

Conceptually, solving a finite difference equation is straightforward. It involves a two step initialisation phase, and a three-step iterative evaluation phase:

Initialisation:

(1) Loading the initial values of the model elements in a defined order
(2) Calculate all parameters needed (in order of evaluation)

[4] An introduction into numerical maths and applications are given at: Acton(1970) or Curtis/Wheatley(1984). Several System-Dynamics Software Tutorials give descriptions of the simulation algorithm – here the standard method description of IThink™ is used.

Iteration:

(1) Estimation of the change of indicators over the interval dt (delta time)
ΔIndicator = dt * flow, flow: e.g. (new cars – scrapped cars)

(2) Calculation of new values for flows or parameters – in a defined order of evaluation.
Parameters = f(Parameters, Constants, Indicators)
Flows = g(Parameters, Constants, Indicators)

(3) Update simulation time. Stop iteration when Time > simulation End Time
Time = Time + dt

Obviously the curve resulting from this proceeding is only an approximation of the curve obtained by an analytical calculation. The accuracy of the approximation depends on the number of iteration steps and thus on the choice of dt. The smaller dt is, the closer the proxy-solution to the analytical solution. The iteration approach is also important. The simplest iteration method is the EULER-method. This method simply uses the value calculated for the flow as its estimate for the change of the indicator over the time-interval dt. If the interval is a large one (relative to the continuous case), an integration error is introduced. Within the ASSEMBLING prototype the EULER approach can be chosen with a sufficiently small time interval so that the integration error can be neglected. The model is initialised with a database using the reference year 1996. Transport data are mainly taken from a database published by the German Institute of Economic Research. The macro-economic data are taken from time series and yearbooks published by the German Federal Office of Statistics. The detailed fleet data are taken from the German Office of Vehicles together with the ASTRA database. ASTRA[5] is also the data source for the environmental issues.

2.12.5. The Web Interface

The substantial part of a knowledge-tool is the provision of a user-friendly interface to make an application of the model easily possible. With the increasingly broad dissemination of Internet access facilities and the increasing acceptance of the Internet as an information source - or even as a knowledge tool -, it seems to be an obvious concept to install the ESS-model on an Internet server and construct the interface as HTML-text and programs which use CGI[6]-tools.

Users can apply the model without installing any specific software packages and without the necessity to transfer complete data sets. In additional, the model and underlying data can by modified and updated whenever it seems necessary, so users always have access to the most recent version of the model.

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[5] especially the part of ASTRA-developed by IWW – Wolfgang Schade

URL: http://iww.uni-karlsruhe.de/ASTRA

[6] Common Gateway Interface: A tool, which enables linkages between html and programs written in C, C++ or Perl. ⇒ Program results can be interpreted and shown by browsers.

The IWW-ASSEMBLING web page[7] is located on IWW's server. It is installed in a Linux environment. Hence it has been possible to use different programs and script languages in a very flexible way.

The parameters, which can be changed, are:

Socio-economic Module	**Transport Module**	**Environmental Module**
Birth rate Migration rate Average person per household Labour productivity Unemployment rate Growth of labour income Growth of GDP per Capita Saving behaviour	Mobility behaviour - average distance travelled - average trips per day - av. person per vehicle Av. tonnes per vehicle Modal split Vehicle ownership rates	Energy consumption - per household - per economic output

Policy tools are given in the following areas:

Area	**Tools**
Migration policy	- Immigration by number ("Green Card" – policy) - Immigration oriented at population development (number and age-structure)
Transport pricing	- Tax - Toll
Fleet policy (technical standards)	Additional emission standards besides EURO I-IV - Determination of pollution per vehicle-km - Determination of the year the standards come into force

During this input process users are provided with some guidance. They can get information about each parameter they want to change. Some statistics about the particular parameters and indicators are given. In addition some general information about them can be found by visiting the installed web pages at the IWW-ASSEMBLING page or other remote pages. Here the advantage of the Internet as an information and knowledge tool becomes clearly obvious. Starting from the base-year 1996 the model generates yearly values of each indicator requested.

[7] URL: http://iww.uni-karlsruhe.de/ASSEMBLING

2.13. Maintenance of ASSEMBLING Information System

The WebPages are available to be delivered to DG-TREN and national sponsors on CD's. The actual pages will remain in the prevailing http-addresses for 2 years. The observatories developed, at this stage as web sites, have a organisation which allows them to continue to act on one hand as centres to relay transport strategic and policy related information and data and on the other hand as platforms where data for modellers can be retrieved. But for ongoing monitoring, assessment analysis or scenario variations additional funds are required.

It is to be noted, however, that none of the organisations hosting the pilot observatories at the moment is obliged to keep the web service alive without external financing from DG-TREN or national administrations. Thus, the future of the observatories depends on continuing finance.

The maintenance of the ASSEMBLING Central Website, as well as the whole ASSEMBLING Internet Service (which includes the regional and thematic monitoring webs), requires a continuous and sustained effort under DG TREN leadership in order to assure scientific consistency, independence, neutrality and policy relevance for all European Transport Observatories. Because of this fundamental requirement, the maintenance of the ASSEMBLING Central Website needs to be integrated into the further development of ETIS. This was the main conclusion of the organisational and institutional analysis carried out during the first part of the research project and this applies not just to the Central Website but also to the regional and thematic Monitoring Websites.

The duration of a start-up observatory study/project should be 3 to 5 years, followed by a conversion phase the subsequent 5 year period with the aim of self sustainability. Then after 10 years the observatory should be capable of continuing with little need for subsidies. The latter two phases depend on how much interest the observatory is for users other than the EC. While the first study could be based on ex-post analyses, there should be a strong effort to provide up to date information and even to include ex-ante analyses. Depending on the monitoring involved, an annual update could either be very expensive or relatively cheap. At least some key variables should be surveyed permanently, but which ones and how, depends on the particular case. In general, for users outside politics, information only has value if it is up to date. For research purposes, the best to have is a permanent and consistent information source with access to all historical data/information. For political/policy purposes, the minimum would be to follow the project until it was finalised but, for strategic and research purposes, it would be important to monitor the impacts of the project for at least 10-20 years in order to collect valuable information for future project decisions and to avoid problems and even errors which emerged. The germ of the original idea of implementing a monitoring/observatory concept assumes a long-term monitoring and comparative analysis; consequently, it must be permanent and updated regularly together with an “early warning assessment” as a quick reaction to particular requests related to new proposals together with an environmental impact assessment.

The following table presents a list of key issues in relation to the DG TREN role in the maintenance of the monitoring concept proposed by ASSEMBLING. These elements need to be incorporated within the overall ETIS plan.

ASSEMBLING component	**DG TREN role in the maintenance and further extension of the monitoring-approach**
Central Website	It should be maintained by an external consultant and co-ordinated with DG TREN's own website, on-going initiatives (e.g. Pocket Book) and CORDIS. European financing is needed.
Regional and project-based Observatories	Partnerships between DG TREN with Member States to co-finance the network seems the best solution.
Thematic Observatories with European coverage	European Transport Associations have to be stimulated by European institutions to develop compatible Internet information services from the information they already are collecting; the goal will be to help these institutions to adopt more formal and open monitoring activities
Knowledge-tools	Consultants and modellers will have to develop more open and accessible forecast and evaluation models. For instance, DG TREN could require modellers to develop these kind on modelling services when a new model has been developed with DG TREN financial support
Directory of Information Sources	Depends on DG TREN willingness to maintain the directory in co-operation with EUROSTAT. Even if data can be restricted in Europe for a variety of reasons, it would be reasonable that the access to a directory of sources can be provided free by public authorities. It is expected that, if successful, companies acting as information sources will themselves be interested in inclusion in the directory.

3. CONCLUSIONS AND RECOMMENDATIONS

The main issues studied in ASSEMBLING were:

- the interest and feasibility of developing a network of observatories to monitor the application of European policies, especially large transport infrastructure projects and,
- the more effective manner to provide such a information to policy-analysts and decision-makers.

Conclusions are first organised according to these issues. Later on, a summary of main recommendations in relation to ETIS are listed.

3.1. Conclusions concerning the monitoring approach

ASSEMBLING provides a complementary source of information (not only data), consistent information and knowledge-tools as well as a communication platform for interaction between the EC and the region/citizen. While EUROSTAT mainly provides "statistical data", the reverse is the case for observatories. They mostly provide information and knowledge-tools. The latter allow the interrelationship of the information to be shown so that one learns about and understands the problems and can develop solutions. This is rarely possible by analysing pure statistics or indicators which are just a combination of such data. Some observatories could also help EUROSTAT and other European statistical sources to close some data gaps as they will be forced to provide standardised information in the observatory network. Another principal issue which could be interesting for EUROSTAT is related to the structure and handling of data by the observatories as this comes down to the basic idea of elaborating strategic transport information.

Selected trans-European transport projects could have an observatory (e.g. EGNATIA) to monitor its progress, with (possible) data: traffics by type of users and purposes, spatial and land use impacts. Following the monitoring activity of each relevant observatory, all available information from interrelated e.g. environmental projects can be incorporated and stored in a uniform shared database. This would provide a wide canvas to compare results across the different projects or to allow applications for other projects. It also avoids unnecessary duplication of effort, in particular among the projects funded by the EC. However, this supposes a consistent coverage of the TEN by a network of observatories, which is relatively expensive.

Before being created, *the objectives of the observatory must be defined* (as precisely and concretely as possible), together with a detailed programme or schedule of actions:

- for whom (who will be the users, user requirements)?
- for which purpose (lobbying, feasibility study, developing permanent statistics, enhance policy transparency, strategy,)?
- what will happen after the investment is completed (maintenance etc.)?

For this purpose, a *framework business plan* has been prepared in the ASSEMBLING project. It consists of a set of tables to be filled in, dealing with organisation, market, costs, revenues, timing of development. It is applicable to any observatory project. It may be used in the future by the European Commission, or by Member States, in order to ensure that the (sometimes contradictory) expectations of the various players involved in the preparation of an observatory can be gathered around *a common objective*.

Over the longer term, observatories should not be dependent on subsidies, therefore the idea of *self sustainability* has to be faced up to in a way which still allows room for independence and neutrality. To increase the attractiveness and value of the system, *knowledge-tools should be included*. In terms of strategy, it might be better to include ASSEMBLING into a European Transport Information System (ETIS) instead of keeping it separate.

In general, the problem of *intellectual property rights* in relation to information and data as well as the knowledge-tools has to be discussed and solved. In this context, in the light of consistency as well as looking forward to ETIS, a *shared data and information base* would be very beneficial.

In an initial stage, DG TREN could *maintain ASSEMBLING*-like regional and thematic observatories (15.000 Euros each minimum cost per year) covering the EU territory. It should also launch specific monitoring studies for particular projects (co-financed by the EIB and Member States). According to the studies needed and the level of detail required, the costs of an observatory will differ. Possible *extensions of the network to CEE countries* should be considered seriously as substantial investment is planned in this area and there is a strong need for monitoring and exchange of experience. This could be done through the ISPA programme. If DG TREN has budget constraints, they should *focus on a network of TEN-T observatories*.

For user requirements, DG TREN should define *"the" questions*. What kind of information do they really need observatories to provide? What is the gap that observatories should fill? It is again important that observatories have a *clearly defined purpose*. They are not important in themselves, they must have a *clear mission* so that they can be designed and implemented accordingly.

3.2. Concerning the "Internet Service" Solution

The ASSEMBLING Information Service (website layouts, structure and supporting software) could be considered as an adequate basis to develop policy-information systems.

From a technological point of view, the Internet solution seems the more adequate for various reasons. The Internet tools which are provided by the software industry, in combination with Bridges Communication System and the new developed ASSEMBLING Internet Server, provide for a forefront software technology to develop highly customised user-interfaces which act as a "communication" tools

between different users and between them and multiple on-line services located in remote places (such as regional observatories). It is also feasible to link to these interfaces more advanced functionalities (mapping, GIS, models, etc.) providing friendly and universal accessibility through the Internet to advanced information and modelling systems. This architecture is specially useful dealing with the ideal user-requirements of a policy information-system, i.e. maximum capabilities with minimum complexity.

Observatories must be Internet based services as much as possible (not all data can be published but one should try to provide a maximum of information free of charge). The possible use of new communication technologies (WAP, Satellites, Mobile communication, Extranets) should be considered if there is a follow-up project to establish an observatory network. It can be concluded that web-based dissemination of transport policy information will have an increasingly important role within the telecommunication society. The maintenance and further development of the pilot observatory web sites can thus be regarded as valid initiative. The observatories themselves should not become "research centres" developing IT systems. An observatory should simply collect, assemble and organise relevant information etc., put it in the context of strategic transport questions, along with brief analysis and interpretation backed up by a deeper examination of the problems. Within the system it is obvious that relevant presentation tools should be used to disseminate the knowledge (GIS, distance simulator for the main destinations by mode etc.) and IT technologies should be incorporated to allow the possibility of feedback (interactive tools, links to models, questions to experts or the observatory, surveys forms etc.). New technologies like internet mapping tools, effectiveness and impact assessment (knowledge) tools should be standardised among the observatories involved (if the tasks allows this) and must be applied to the compatible data sources based in particular on shared databases.

3.3. Recommendations in relation to ETIS (European Transport policy-Information System):

In relation to the “monitoring inniciative”:

- Results indicate that *the best short-term option to include a “monitoring inniciative into ETIS” will be through the establishment of a network of observatories on a regional or interregional basis, managed by independent consultants and experts selected on open bids, supervised by DG TREN and covering projects and policies more relevant to their area of interest*.
- European observatories should act as an “interface” assembling data and information from local, regional and national monitoring institutions according to European policy needs.
- There is a need to define an organisational solution (such as the one proposed: management by independent consultants and experts selected on open bids*)* simplifying financing costs, avoiding subsidiarity problems, and assuring scientific consistency and political neutrality.

- The possibility to go an step ahead and develop "project-specific monitoring centres" was studied in one particularly relevant case-study; it may require more intensive investments (because the observatory should probably need to carry on specific surveys and become a direct source of data and information) and it may raise subsidiarity issues since in fact the observatory would audit ex post and to some extend also ex ante national and regional decision-making processes. Needless to say, its interest at European level could be very high since the observations provided are more closely attached to the field.
- *All considered, ETIS Reference databases should contain an information service based on monitoring specific policies and infrastructure projects.*

In relation to the Internet Service approach:

- Results indicate that *an Internet Service is the more efficient technological option to harmonise, link and convert disperse data and information into policy-meanigful information and knowledge-based service to European policy-analysts and decision-makers.*
- ASSEMBLING has developed techniques to assemble and give friendly Internet access to data and information coming from a network of regional and thematic observatories.
- ASSEMBLING has developed a methodology to create “knowledge-tools” (user-friendly policy-interfaces linked to interactive forecast and evaluation models running on remote Internet servers) as added-value services linked to the policy-information service. Users of Information Services developed according to the ASSEMBLING methodology (policy-analysts and decision-makers) will become both more informed (concerning on-going impacts and needs of transport policies) and more knowledgeable (concerning potential impacts of new policies).
- *All considered, the information, forecast and evaluation services to be included into ETIS should be accessible to users by applying the technologic solutions developed in ASSEMBLING.*

Annex 1: Questionnaire to develop the business plan of an observatory

A DEFINITION OF THE PILOT PROJECT

A1 Identification

1	**Name of the observatory**	

	Name of the company / organisation which is initiating the observatory	
	Name of the responsible	
	Address	
	Tel/ Fax/ e-mail	

2	**Description of the observatory's general profile (max 10 words)**	
3	**Current state of development of the observatory**	

A2 General objectives

A list of possible objectives is given hereafter. For each item, answer Yes or No, and if yes, provide a maximum of details for your specific project

1	**Exchange of experiences**	
2	**Lobbying**	*According to existing experiences, the most successful observatories are dealing with:*
3	**Help operators' decisions**	*· a specific infrastructure, or*
4	**Support plan & prospective studies**	*· the improvement of regional development*
5	**Support research**	*· the supply of information to professionals of transport, with large dissemination*
6	**Environment policy impact**	
7	**Supporting observatories**	*They generally cover several modes of transport.*
8	**Commercial and / or public data**	
9	**Monitoring databases**	
10	**Others goals**	

A3 **Specific goals**

Specify the specific goals of your monitoring center, if relevant. Provide a maximum of details

1		
2		
3		
4		

B **PROPOSED CONSTITUENCY**

B1 **Institutional and legal framework**

In your opinion, which could be the most convenient status for your observatory ? Explain why

1	**Public**	
2	**Private**	
3	**Partially financed by public (%)**	
4	**Association**	
5	**Other**	

B2 **Host body**

1	**Administration**	
2	**Association**	
3	**Private company**	
4	**International organisation**	
5	**Other**	

B3	**Staff.** *Describe the future staff assigned to the observatory: permanent staff, seasonal staff, and specify if it will be part- or fultime. Estimation of wages.*	

B4	**Members**. *If relevant for your observatory, give a description (or name) of the future members of the project.*	

B5	**Conditions of membership.** *What will be the conditions to become member of your observatory ? (subscription (and amount), type, none...)*	

C POTENTIAL CLIENTS (*)

According with the objectives of the observatory (describe in A2), type of output (D) and data confidentiality (E), what are your clients targets and the type of information corresponding to each target ? Define them with maximum details

		Core clients	Other clients
1	**Public administration**	*The target clients often belong to the public sector. Private sector seems to be more interested by ad-hoc studies than observatory output.*	
2	**Members of the observatory**		
3	**Private companies**		
4	**Other (specify)**		
5	**Geographical localisation of clients**		

(*) A typology of potential clients will be built later on

D OUTPUT OF THE OBSERVATORY

Describe the output which will result from the activity of the observatory, with maximum details

	OUTPUT OF THE OBSERVATORY				MODALITY OF DISSEMINATION				
	Describe the outputs of the observatory	Format	Languages used	Cost for designing, printing, translations	Confidentiality	By mail, on request, on line, by press.....	Selling price for each output	Frequency / periodicity for each output	Clients' profile
1		*The nature can be various, from regular newsletters to ad-hoc reports, conferences on-line products, conferences,...*	*For a wide dissemination, translations are necessary.*		*Confidentiality can be a brake upon wide dissemination, but can be a condition of success in case of sale to professionals*	*The modes of dissemination are closely linked with the nature of client or goals of the observatory (and the necessity or not to be financially independent). There is no rule.*			
		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
2	**Total cost for outputs (ECU/year)**								
3	**Total revenues from sales (ECU/year)**								

E DATA COLLECTED

E1 Nature of the data

For each item, answer Yes or No, and if yes, describe the data collected (or to be collected) within your pilot project, with maximum details. Specify if it is qualitative or quantitative data and explain the contents.

Specify the support (paper, digital data base), on line data base...

1	**Socio-economic data**	*Most existing observatories collect different kinds of data to make multi-dimensional analysis.*
2	**Environment data**	
3	**Flows / traffic data**	
4	**Networks data**	
5	**Transport services (tariffs, schedules....) data**	
6	**Safety / accidents data**	
7	**Eurostat data**	
8	**Other data (specify)**	

E2 Availability of the data identified above

For each type of data collected (or to be collected), give maximum details on its availability : if the data is at no cost, or with restricted access (and what kind of restriction it is) /how expensive it is to get it

(cost of collection and of data itself) / how will the data be obtained (purchased from a data supplier, through a specific

		Type of data (see above E1)	Data supplier. *Specify if access is restricted or not*		Periodicity of data purchased	Collection methodology (specific surveys, size of the sample, buying from suppliers ....)			Cost of each data purchased	Cost of surveys. *if possible with breakdown: labour, staff, computer treatment...*
1	1..2..3...		*The main sources are public (European and National administrations, public institutions...). They are dispersed and are rarely compatible.*							
			Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
2		**Total cost of data purchased or collected (in ECU/year)**								
3		**Total cost of surveys (in ECU/year)**								

E3 Treatment of the data

1	**What type of analysis will you make on the data purchased or collected** *(socio-economic evolutions such as past trends, forecasts, sorting of data, make the data consistent, build data bases) ?*	*Consultancy services provide a value added (data often have few value in isolation).*							
2	**What other treatment** *(GIS, modelling, monitoring of studies ...)?*								
3	**Will you correct or check the data collected from other organisms, or use them as they are ?**	*The quality of data provided by the observatory imply a checking of the consistency of the data collected.*							
4	**Necessary staff and equipment for each treatment** *(specify with the maximum of details)*								
		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
5	**Cost of staff & equipment for data treatment**								

F COSTS OF OFFICE EQUIPMENT AND OFFICE RENTAL

1	**Describe the equipment and softwares which will be purchased for the project and their corresponding costs. Specify the office surface**	*Presently, the equipment of the existing observatories is limited, and very few are able to communicate directly through computer network and electronic data highway. It will be a necessity in a near future.*							
		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
2	**Computer equipment**								
3	**Communication equipment**								
4	**Softwares**								
5	**Electronic data highway**								
6	**Office rental**								
7	**Other (specify)**								

G FINANCIAL FORECAST

G1 Financial resources

		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
1	**Sales (see D3).** ***output x unit price of output x frequency of publications***								
2	**Subsidies.** ***Try to evaluate possible subsidies that could be got for the observatory***	*In most cases, resources are a combination of public budgets, subsidies and sales.*				*The lack of resources is one of the main condition of failure (or at least limit) of existing observatories.*			
3	**Other resources.** ***Mention all other resources that the observatory could get***								

G2 Operating cost breakdown

		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
1	**Staff.** ***Number of permanent staff x wages (see B3)***								
2	**Cost of collecting and treatment of data (investigators, in-office work...). (See E3)**								
3	**Cost of data purchased (See E2)**								
4	**Other operating costs.** *Overhead expenses, computers (see F).....,* *publication of output (see D2 output x frequency) x cost of publication...*								

G3 Investments and other costs

		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
1	**Investments**								
2	**Other (office rental...)**								

G4 Financial results

		Year N	Year N+ 1	Year N+ 2	Year N+ 3	Year N+ 4	Year N+ 5	Year N+ ...	Year N+ ...
5	**Profit**								
6	**Debt (specify the details)**								

H COOPERATIONS WITH OTHER CONSTITUENCIES OR PARTICIPATION IN A NETWORK

If the fair running of your observatory needs cooperations or participation in a network, or if you plan to be part of a wider system, explain here

1	**Will the observatory have regular cooperations with other organisations (formal or informal, participation in a network...)?**	*In spite that most observatories are wishful of co-operation, their is a lack of co-ordination and synergy between existing observatories.*	*This point is very sensitive: common sense suggests that co-operation is a key of success, but the management of data is power stake, and collaboration are easier in complementary fields than in the same field.*
2	**Will the observatory participate in a network ?**		

Annex 2: Screen shots of the Internet Service

SCREEN SHOTS FROM ASSEMBLING websites

1	Location of ASSEMBLING regional observatories
2	TETN projects related to the observatories
3	Front page of the website of one observatory
4	Scope of the observatories
5	Expert analysis provided by one observatory (synthesis of what's happening at regional level that interest European transport policies)
6	Regional news interesting at EU level (PRO Observatory)
7	Basic data (PRO Observatory)
8	Basic information (PRO Observatory)
9	Advanced GIS tools (PRO Observatory)
10	Impacts of the A2 motorway (PRO Observatory) I
11	Impacts of the A2 motorway (PRO Observatory) II
12	Impacts of the A2 motorway (PRO Observatory) III
13	NTO website: Front page
14	NTO: Front page
15	NTO: Graphic of a key indicator
16	NTO: Area of the observatory and most important road infrastructures
17	NTO: Area of the observatory and most important rail infrastructures
18	NTO: E18 road. Link to E18 monitoring website
19	E18 website: impact of the corridor in municipalities
20	CETMO front page
21	CETMO: Projects in the Maghreb countries
22	CETMO: Road projects
23	TEMO: Front page
24	TEMO: Basic data
25	TEMO: Impacts of railway projects I
26	TEMO: Impacts of railway projects II
27	RGO: Front page and link to the official Betuwe line website
28	RGO: List of existing studies concerning the Betuwe Line

29	WCMC: Thematic observatory
30	WCMC: Protected areas in the RGO area
31	WCMC: Distance to populated areas in RGO area
32	WCMC: Distance to populated areas in TEMO area
33	Presentation of ASSEMBLING: Knowledge-system
34	ASSEMBLING Internet Service Front page
35	Presentation of ASSEMBLING What's up?
36	Links to observatories from ASSEMBLING What's up I
37	Links to observatories from ASSEMBLING What's up II
38	ASSEMBLING What's up. Main menu. Driving forces
39	ASSEMBLING What's up. Description of scenarios. Links to tables with key indicators
40	ASSEMBLING What's up. Links to TETN maps
41	On-line directory of European data sources
42	Presentation of ASSEMBLING What if...?
43	Links to knowledge-tools
44	Sample of knowledge-tool I: Kyoto's CO2 agreement
45	Sample of knowledge-tool II: Calculation of CO2 for different GDP growth scenarios
46	List of available knowledge-tools
47	Sample of knowledge-tool III: When TERN will be completed?
48	Sample of knowledge-tool IV: Calculation of National investments needed before 2004
49	Dynamic System model: Definition of policy instruments: Transport policies
50	Dynamic System model: Definition of policy instruments: Migration policies
51	Dynamic System model: Definition of policy instruments: Migration policies
52	Dynamic System model: Definition of indicators to calculate
53	Dynamic System model: Results in table
54	Dynamic System model: Results in graphic
55	KTEN knowledge-tool to forecast traffics: Presentation
56	KTEN knowledge-tool to forecast traffics: Shortest paths
57	KTEN knowledge-tool to forecast traffics: Trees
58	KTEN knowledge-tool to forecast traffics: Traffics

59	KTEN knowledge-tool to forecast traffics: Traffics
60	KTEN knowledge-tool to forecast traffics: TETN with higher traffic levels
61	TEN Multimodal: Long distance trips
62	KTEN knowledge-tool to forecast traffics: Road projects with higher traffics
63	KTEN knowledge-tool to forecast traffics: Traffics in rail projects
64	Data estimates to be validated by observatories
65	Presentation of ASSEMBLING graphs
66	Image of a simplified graph
67	ASSEMBLING Front page
68	ASSEMBLING which policy to choose and how to implement it?
69	ASSEMBLING methodological approach