

Final Report for Publication

FORCE 3 *RO-96-SC.302*

Project Co-ordinator: ERTICO on behalf of the Bundesministerium für Verkehr (DE)

Project Partners:

BE: Tritel N.V.,

DK: Danish Road Directorate,

FI: Finnish National Road Administration,

FR: Direction de la Securite et de la Circulation Routieres, Eurolum CGE, TDF / CNET, Renault, PSA Peugeot Citroen, Carte Blanch Conseil, ISIS S.A.,

DE: Bundesministerium für Verkehr, Innenministerium Nordrhein-Westfalen, Robert Bosch GmbH, Heusch/Boesefeldt GmbH, ERTICO s.c., Corporate Systems GmbH,

IT: Mizar Automazione SpA, Autostrade Italia Nord Est, Radiotelevisione Italiana,

NL: Rijkswaterstaat AVV, Korps Landelijke Politie Diensten, NOB, Philips Car Systems, ITS Nijmegen University, Belmont b.v.,

ES: LISITT Universidad de Valencia, Centro Nacional de Information Geografica, Ingenieria de Sistemas para la defensa de Espana S.A., Servicios Generales de Teledifusion S.A.,

SE: Swedish National Road Administration, AB Volvo Technological Development,

UK: Department of Transport, The Automobile Association

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1. PARTNERSHIP

Domain Name	RDS-TMC	Programme	Transport RTD			
Activity	FORCE 3	Start - End dates	January 1997 - December 1999			
	Participant's Institution/Organisation	FORCE 1	FORCE 2	FORCE 3	ECORTIS	
<i>BE</i>	Tritel N.V.	●	●	●	○	
<i>BE</i>	MVG - Flemish Ministry				●	
<i>BE</i>	MET - Walloon Ministry of Transport				●	
<i>DK</i>	Danish Road Directorate	●	●	●	●	
<i>FI</i>	Finnish National Road Administration	●	●	●	●	
<i>FR</i>	Direction de la Securite et de la Circulation Routieres	●	●	●	●	
<i>FR</i>	Euroalum CGE	○	○	○	○	
<i>FR</i>	TDF / CNET	○	○	○	○	
<i>FR</i>	Renault	○	○	○	○	
<i>FR</i>	PSA Peugeot Citroen	○	○	○	○	
<i>FR</i>	Carte Blanch Conseil	○	○	○	○	
<i>FR</i>	ISIS S.A.	○	○	○	○	
<i>DE</i>	Bundesministerium für Verkehr	●	●	●	●	
<i>DE</i>	Innenministerium Nordrhein-Westfalen	○	○	○	○	
<i>DE</i>	Robert Bosch GmbH	○	○	○	○	
<i>DE</i>	Heusch/Boesefeldt GmbH	○	○	○	○	
<i>DE</i>	ERTICO s.c.	○		○	○	
<i>DE</i>	Corporate Systems GmbH	○	○	○	○	
<i>IT</i>	Mizar Automazione SpA	●	●	●	●	
<i>IT</i>	AISCAT				○	
<i>IT</i>	Autostrade Italia Nord Est	○	○	○		
<i>IT</i>	Radiotelevisione Italiana	○	○	○	○	
<i>NL</i>	Rijkswaterstaat, AVV	●	●	●	●	
<i>NL</i>	Korps Landelijke Politie Diensten	○	○	○	○	
<i>NL</i>	NOB	○	○	○	○	
<i>NL</i>	Philips Car Systems	○	○	○	○	
<i>NL</i>	ITS Nijmegen University	○	○	○	○	
<i>NL</i>	Belmont b.v.	○	○	○	○	
<i>PO</i>	Junta Autonoma de Estradas				●	
<i>ES</i>	LISITT, Universidad de Valencia	●	●	●	○	
<i>ES</i>	Direction General de Traffico				●	
<i>ES</i>	Radio Nacional Espana					
<i>ES</i>	Centro Nacional de Information Geografica	○	○	○		
<i>ES</i>	Ingeneria de Sistemas para la defensa de Espana S.A.	○	○	○		
<i>ES</i>	Servicios Generales de Teledifusion S.A.	○	○	○		
<i>SE</i>	Swedish National Road Administration	●	●	●	●	
<i>SE</i>	AB Volvo Technological Development	○	○	○	○	
<i>UK</i>	Department of Transport	●	●	●	●	
<i>UK</i>	The Automobile Association	○	○	○	○	

● contractor/beneficiary

○ associated or sub-contractor

2. EXECUTIVE SUMMARY

This is the FORCE 3 Final Report for January 1997 to December 1999 covering the FORCE 3 Work Areas and links to work carried out in the FORCE 1, 2 and ECORTIS Work Areas. For consistency and transparency the results of the sister projects are included in this report.

The projects have met their target to provide TMC services across much of Europe. The main achievements during the reporting period in the projects overall are:

- The projects met their target for TMC services across much of Europe by the end of 1998.
- The European MoU for services has been created, agreed and signed by most actors. The TMC Forum has been set up to co-ordinate European activities on a permanent basis. The TMC Forum has a fully active web site: <http://www.tmcforum.com>
- Two web sites were available during the projects period:
 - a site for the TMC Forum <http://www.ALERT-tmc.com>
 - a projects working site <http://www.rds-tmc.com>
- The TMC Compendium is complete and accessible from the web sites. It contains all the information essential for RDS-TMC service providers and other actors.
- Technical development and consensus formation plus the main standards are complete.
- There is harmonisation between RDS-TMC and DATEX.
- TMC products have been encouraged and a wide range is now emerging.
- A large number of reports have been completed (see the deliverables list).

Specifically, FORCE 3 has:

- Contributed to the overall co-ordinated management of the FORCE-ECORTIS projects.
- Created the technical information for System Architecture Definition.
- Created the Location Coding Guidelines including the Recommended Location Data Model (RLDM) and especially the Physical Data Model which is part of it, plus the Database Exchange Format
- Operational Guidelines were created and merged with the Installation Guidelines under ECORTIS to create Implementation Guidelines.
- The Organisational Model/Guidelines achieved consensus in January 1998.
- QA Models for Information Content showed that there is no single “perfect” answer for how QA should be provided - user needs differ in different member states and there are also many different actors involved in the chain.
- QA Requirements for RDS-TMC integrated Quality Criteria with ALERT service levels
- Operational Support for QA Processes during the start-up of services made sure maximum feedback was obtained on the ideas and procedures.
- There was no direct assessment of individual services by the FORCE 3 project, instead, guidelines were produced to help each service provider carry out their own service evaluation:
 - Evaluation Framework – Impacts:
 - Apply to National Service Impact Plans:
 - Integrate into European Impacts:
 - RDS-TMC services meet basic acceptance criteria such as actual use by drivers who have an on-board TMC receiver, comprehensibility of information and level of satisfaction with the service;
 - Drivers exposed to TMC information feel better informed;
 - Considerable traffic efficiency impacts due to TMC information were experienced by 10% to 20% of the drivers.

3. OBJECTIVES OF THE PROJECT

The objective of FORCE 3, and its sister projects FORCE 1, 2 (ended in February 1999) and ECORTIS (ended in December 1998), is to enable the implementation of RDS-TMC services with European-wide functionality. The projects aim for a minimum quality of service across the project countries, taking into account the current status in each country.

The programmes that these projects are involved in are:

- FORCE 1 and 2: provides support within the Fourth Framework Telematics Applications Programme for the introduction of RDS-TMC services with European-wide functionality;
- FORCE 3: continues the work within the Fourth Framework Transport Programme for the Research and Technological Development aspects of RDS-TMC necessary to implement services with European-wide functionality; and
- ECORTIS: co-ordinates the implementation of RDS-TMC with European-wide functionality supported by the budget line for the Trans-European Network for Transport.

Eleven European countries (ten involved in the FORCE projects) have come together to agree on European needs and to introduce services and products that conform to European requirements.

The concept of the Traffic Message Channel (TMC) allows traffic messages to be standardised, encoded and transmitted in a digital form but through RDS in parallel with the current broadcast programme. This provides significant advantages, such as:

- immediate access (each message is always in the air and can be retrieved at any time);
- language independence (messages presented in driver's own language regardless of location);
- faster delivery of information (no need to wait for the programme slot for traffic information);
- greater flexibility for the broadcaster and transmission network operator;
- the facility to provide a greater quantity of traffic information;
- the ability to filter information, geographically at first but in the future by area of interest;
- potential future use for added value services such as route guidance systems.

These technical advantages can be translated into societal and economic benefits: increased road safety, more efficient mobility with reduced environmental impact and opportunities for industry.

The reality is that there is a network of RDS-TMC services across Europe, with subtle differences in content and quality. The advantage of harmonising and interconnecting services is that any user can use the same receiver in any country in Europe and expect to receive a minimum quality of service. The service providers and other actors in the business chain for RDS-TMC also vary across Europe, with both complementary and overlapping services.

To ensure that services are continuous, interoperable with any receiver and reach agreed quality levels, a number of elements at the European level are at the core of the FORCE-ECORTIS projects:

- common functionality according to agreed definitions, including service and system architecture;
- common guidelines for implementing and operating services including quality assurance;
- common understanding of the European elements and of basic services;
- co-ordination between service providers as well as all RDS-TMC actors;
- exchange of traffic information between services;
- standards and specifications that are used by all actors in the business chain;
- framework for European activities (Memorandum of Understanding and TMC Compendium).

The guidelines and agreements that result from the projects knit the services together so that they are truly European in nature. There is no such thing as a single European service, but the needs of interoperability, continuity compatibility and a minimum quality of service have been met through the ECORTIS outputs.

RDS-TMC is the first priority action in the Community Strategy and Framework for the Deployment of Road Transport Telematics in Europe (COM(97) 223 Final), adopted by the Council of Ministers on 17th

June 1997. The potential of Road Transport Telematics (RTT) has been recognised by the Council of the European Union, the European Parliament and the Economic and Social Committee (Council Resolution of 24.10.94 OJ 94/C 309/01 of 5.11.94, Council Resolution of 28.9.95 OJ 95/C264 of 11.01.95, Resolution of the European Parliament of 29.6.95 PE 212.659/fin, Opinion of the Ecosoc on COM(94) 469 final of 25.10.95 CES 1160/95 and Council Resolution of 11.3.97 n° 6321/97 Trans 33).

The Community Guidelines for the development of the Trans-European Transport Network (Decision No. 1692/96/EC) include road traffic management projects under Article 20, under which RDS-TMC fits. EU objectives are to guarantee cross-border interoperability and to facilitate the creation of a European Market for products and services. RDS-TMC provides an important service with profound socio-economic and political impacts, including the opening of a major new European market. It also acts as a flagship project for many other future road traffic management telematics applications; work is underway to set RDS-TMC into the context of these future applications and technological progress on emerging communications media and protocols (such as GSM, DAB, DARC, GATS, WAP, etc.).

4. MEANS USED TO ACHIEVE THE OBJECTIVES

The Projects Structure

Figure 4.1 below shows an overview of the projects structure.

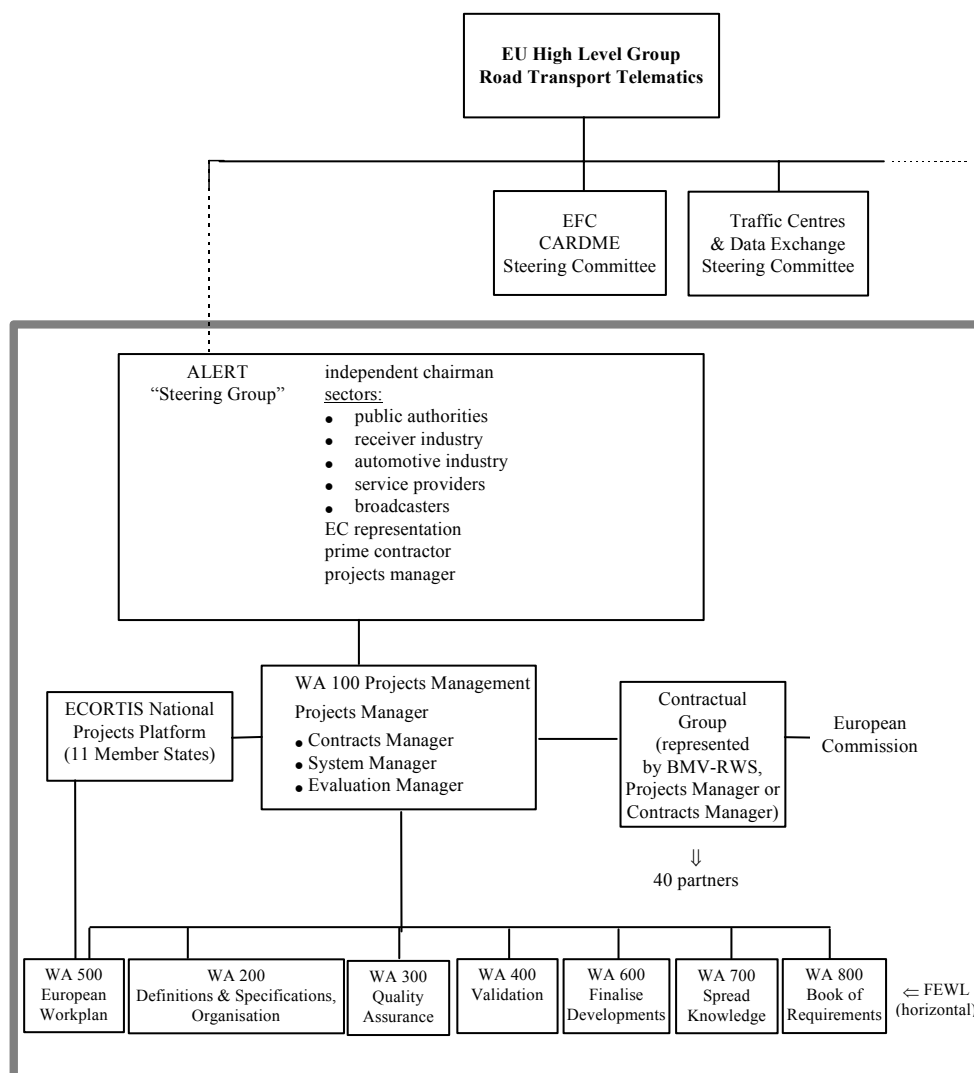


Figure 4.1: Overview of the project structure

Figure 4.2 shows the Work Areas and their relationship to the previous Work Packages. . The Work Area Tasks have been updated slightly since the projects re-organisation to reflect the evolving nature of the work. Task 230 - Events List Transformation has been moved to WA 500, and a new task has been added to WA 600: 670 ALERT Coding Handbook.

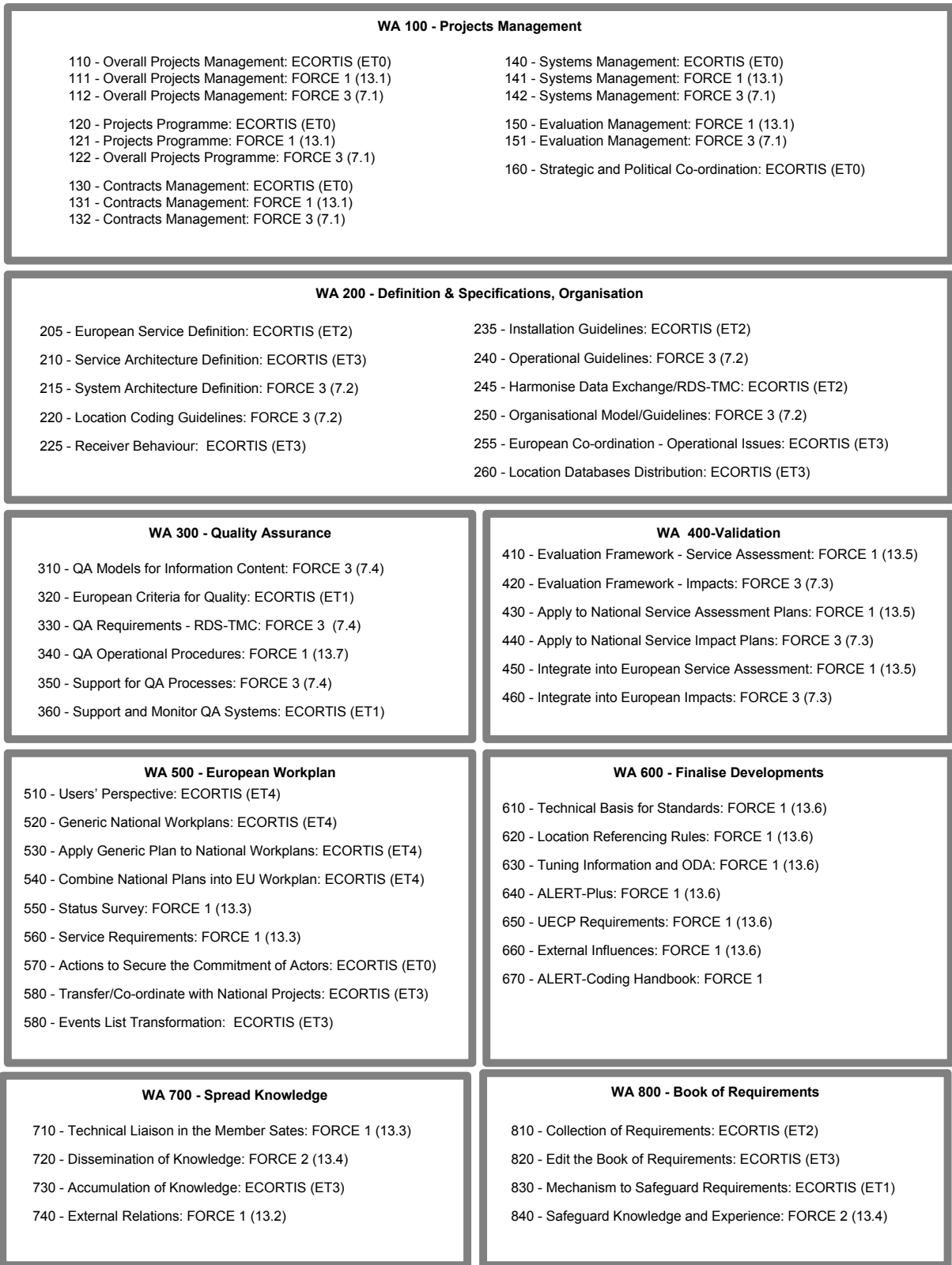


Figure 4.2: The Work Area Structure

Project management

Overall Projects Management

The effective overall management of the FORCE 3 project was assured through the workings of the Projects Management Group. The purpose of this group was to provide clear and effective management of the projects to ensure that the projects were capable of attaining their objectives. The composition of the Projects Management group was the Projects Manager, the Contracts Manager, the System Manager and the Evaluation Manager. The Projects Manager was responsible for the co-ordination and control of the projects management.

The Projects Management group maintained daily links through telephone and e-mail, met normally at weekly or bi-weekly intervals as appropriate to the stage of the projects and focussed on the Brussels office of the projects. The Projects Manager was responsible for the following overall tasks:

1. Leadership of the projects and the management of the projects, with a pro-active style.
2. Acting as the first point of contact for the Commission for day-to-day matters.
3. Agreeing work plans with the Systems Manager, the Contracts Manager and the Evaluation Manager, monitoring progress, identifying difficulties and monitoring corrective actions.
4. Operating and monitoring the project quality control, consensus and management procedures, including the system of checks and balances.
5. Developing management and quality control procedures appropriate to project activities.
6. Preparing reports on project management performance.
7. Arranging both internal external technical audits.

The successful achievement of this management effort is reflected in the complimentary remarks on project management at the 1998 annual technical review.

Projects Programme

The Projects Manager operated the overall projects programme with support from the Systems Manager on the creation of work plans in each Work Area and their integration. This integration was brought together in a single document: Projects Overview that formed the basis against which projects progress was monitored. The regular meetings of the Management Team carried out this progress monitoring.

Contracts Management

The Contractual Group was set up to provide a forum for monitoring, contractual compliance and taking actions on contractual matters on behalf of the projects. The composition of this group was the Bundesministerium für Verkehr, as Prime Contractor for the FORCE contracts and project co-ordinator for ECORTIS, together with the Rijkswaterstaat as the other main contractual client of the Projects Management and their sub-contractors and the Projects Manager. The group met on a regular basis, serviced by the Contracts Manager. The following business was the focus of the group:

- review the report of the Contracts Manager on contractual performance of the partners and determine any remedial actions;
- monitor the performance and quality of projects management and identify any remedial actions;
- review, amend where necessary, and approve contractual reports and matters between the projects and the European Commission;
- advise the projects partners on the progress and performance of the contracts;
- monitor the sound management of revenues and payments.

In order to achieve these objectives, the Management Team created a system of checks and balances, enshrined in document 100-D706.D03: Financial Management of the FORCE and ECORTIS Projects. This document included the contractual requirements showing contractual distinctions and the responsibilities of the Contractual Group. The performance of partners against contractual obligations were defined, together

with how the Contracts Manager instructs partners to complete cost statements, the check and balance procedure (to verify with Work Area Leaders and Projects Management that partners had fulfilled their obligations) and contractual implications for sleeping partners. Financial administration was detailed including the procedure for forwarding payments. Annexes demonstrated the procedures: a Gantt-Chart and a Pert-Chart for the Check & Balance Procedure, an example for partners' justifications and an example of a proposal for distribution of the received money from the European Commission to the partners.

The Contracts Manager was responsible for the following tasks:

1. Creating clear contractual distinctions between the FORCE 1 contract, the FORCE 2 contract, the FORCE 3 contract and the ECORTIS decision.
2. Monitoring the performance of partners against contractual obligations.
3. Preparing reports to the Projects Manager and the contractual decisions group on contractual performance of the partners.
4. Carrying out the sound financial administration of the contracts.
5. Preparing, in liaison with the Projects Manager, all formal reports to the Commission on behalf of the Prime Contractor/project co-ordinator; distributing all relevant communications from the Commission within the projects.
6. Contractual input to the overall projects and individual work areas programmes.

Systems Management

By Systems Manager we mean technical co-ordination (the term derived from the RTD programme). The System Manager was responsible for the following tasks:

1. Agree work plans, take corrective actions and report progress to the Projects Manager.
2. Acting as the technical guardian for the projects.
3. Convening the FEWL meetings; convening and chairing FEWL debates.
4. Guiding the technical work of work areas, monitoring the need for technical work, assessing relevant time-scales, arranging work plans, and monitoring the technical performance of work areas.
5. Operating work area programmes, including agreeing activities and time-scales with work areas and monitoring performance against the programmes.
6. Providing support to the Projects Manager on the overall projects programme including inputs from the work areas and advice on the implications of interaction between the overall projects and individual work area programmes, and information on the contractual performance of partners within work areas.
7. Co-ordinating technical activities between the work areas and with external bodies.
8. Operating, maintaining and developing the projects' on-line information systems including the call-desk and web site.
9. Co-ordinating the technical contribution to annual technical reviews and other technical audits, projects' meetings and external events.

To achieve these tasks, the FEWL (FORCE-ECORTIS Work Area Leaders) group was set up. The purpose of this grouping was to ensure coherence between FORCE-ECORTIS technical activities, to elaborate technical guidance and to provide input to ensure the accuracy of the projects programme. The composition of the FEWL was the Projects Management and the leaders of all projects work areas. The FEWL carried out the following business:

- actions arising from the report of the Projects Management that affected the business of the work areas;
- input to the projects programme;
- forum for discussion and information exchange between work areas.

Additionally, further meetings of the FEWL, known as the FEWL debate, were expanded to include invited experts, to:

- debate on technical issues and advise on appropriate solutions;
- take actions to seek and obtain technical consensus both internally and externally;
- act as a forum for discussion and information exchange between work areas.

Each work area leader was responsible for the following tasks:

- develop and maintain the work area plan;
- bi-monthly review report to the Contracts Manager on partner involvement;
- technical content of the work area output and relevance to the work area plan;
- liaison with the System Manager, including consensus management;
- liaison with and between the core partners of the work area including operating work method procedures;
- reporting progress and difficulties to the Projects Manager;
- liaison with the Projects Manager on quality control of reports and deliverables, including the routing of reports in accordance with procedures;
- input of data for project planning to the Projects Manager.

Evaluation Management

The Evaluation Manager was responsible for the following tasks:

- Agreeing work-plans, corrective actions and report progress to the Projects Manager.
- Creating the evaluation framework.
- Managing the overall activities of validation work areas and ensuring their co-ordination both between the validation work areas and with other projects activities, together with programme horizontal activities.
- Facilitating and stimulating the validation plans in the national projects.

5. SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT

Achievements according to the Community Strategy and Framework

According to the available Community Instruments, a series of actions for the development of RDS-TMC were proposed in the Community Strategy and Framework. The projects have had these effects on the actions:

A. Research and Development

This phase is largely complete through the FORCE projects. Work is continuing on the development of the information exchange protocols.

B. Technical Harmonisation

This has been achieved in various key areas to ensure continuity and interoperability for multi-modal travel and traffic information services.

- The Commission has encouraged the rapid adoption of the standards in the European standardisation bodies. For the RDS-TMC standards, Parts 1 and 2 are CEN/ISO full standards, part 4 is a CEN full standard and part 3 is in the process of finalisation; the FORCE projects have been largely responsible for this work.
- Member States have promoted the introduction of RDS-TMC through the ECORTIS project and implemented their services according to the standards and specifications.
- Through the ECORTIS project, the Commission facilitated the signing of a Memorandum of Understanding (MoU). This was signed by more than thirty public and private organisations, including all relevant countries. It demonstrates the commitment of all actors and records the basis on which RDS-TMC services and equipment will be supplied, introduced and operated with European functionality covering commitment to service provision and the use of standards on the road sector of the TEN-T NETWORK. It was signed by the target date of October 1997, in time for the announcement by the Transport Commissioner at the Berlin World Congress on Intelligent Transport Systems.
- In certain countries, some features of RDS may be misused for publicity purposes and may endanger road safety. The national radio regulatory bodies need to enforce the application of the CENELEC standard regarding the use of RDS features. However, this is not a concern of TMC or of the project, but rather of the appropriate national radio regulatory authorities.

C. Co-ordination of Implementation

Co-ordination activities have defined pan-European RDS-TMC implementation policies and strategies, and ensured the commitment of all parties involved. The ECORTIS project has assisted the Commission to:

- restructure the RDS-TMC Steering Committee to include representatives of broadcasters and industry, so as to promote the commitment of all actors to the MoU. This became the ALERT Steering Group;
- facilitate the availability of language modules for lesser spoken languages. These are now available for a number of such languages, for example, Danish;
- include procedural rules in the TMC Compendium, through the project;
- encourage consensus building;
- publicise the potential benefits and characteristics of TMC.

Through the ECORTIS project, the Member States have clarified their roles. The harmonisation of TMC with DATEX is complete.

D. Financing

A minimum level of basic intelligent infrastructure (monitoring, Traffic Information Centres, data exchange) has been established on the road sector of the TEN-T NETWORK to guarantee a Pan-European service, with significant impetus provided by the Euro-Regional Projects.

Corresponding national location databases and message lists in all languages have been established by Member States using formats agreed in the ECORTIS project, and maintenance procedures have also been agreed in the project.

E. Legislation

The need for a directive has been avoided due to the co-operative efforts of the Commission and ECORTIS, and the establishment of the MoU and TMC Forum.

Specific Achievements of the FORCE 3 Project

Definition and Specifications: Organisation

Task 215 – System Architecture Definition:

This task concentrated on these main activities:

- functions of an RDS-TMC system relevant to European needs, based on national systems;
- synchronisation in Europe of the common functions within the national systems; and
- relationships to standards and protocols, including how they fit into the system architecture.

The output of this task was technical information to feed a number of other tasks and in particular for the service architecture definition and the implementation guidelines.

Task 220 – Location Coding Guidelines:

Creating these guidelines contained these main activities:

- how to use the location coding “standard”;
- rules and dates for updating the bases;
- technical rules for exchanging databases; and
- synchronisation of coding approaches in Europe.

FORCE-ECORTIS recommends all actors to use the Recommended Location Data Model (RLDM) and especially the Physical Data Model which is part of it. The RLDM offers an unambiguous interpretation of the Location Referencing Rules which facilitates the development and maintenance of ALERT-C location databases and ensures the correct interpretation of ALERT-C location databases by RDS-TMC receivers.

Deliverable 220.1 “Location Coding Guidelines” gives an overview of the developments in ALERT-C location coding for developers and users of ALERT-C databases. Recommendations for further actions are presented that are partly beyond the scope of location referencing.

Additionally, to promote exchange of databases a Database Exchange Format was created. To assure uniform interpretation of the location referencing rules a Recommended Location Data Models (RLDM) was developed. The (RLDM) is a tool for creation and management of ALERT-C locations. For the development of the RLDM, a common method for creating relational databases from conceptual model to physical model has been used. With the RLDM there are also SQL-scripts, consisting of SQL-statements that can be used to implement the location database in most relational database management systems.

The countries that participate in the FORCE-ECORTIS project are developing their national location databases. Parts of these location databases will be used to create the European location database, used for the European-wide services. Therefore, it is necessary to organise the location data exchange. The location data exchange format is used for the exchange of location data sets between TIC’s and between TIC’s and Service Providers, and receiver database bearer manufacturers and others. The ALERT-C location databases are used for other purposes than for TMC services. Therefore, the exchange format is divided into three parts with a header.

Task 240 – Operational Guidelines:

This task concentrated on defining organisations and responsibilities in each country for the operation of the service. To do so it made linking pins between the operational organisations, identified and defined general European operational guidelines; created consensus on these guidelines and created a process to ensure the updating of these guidelines.

As explained under Task 235 it became apparent that the results out of this task should be merged with the Installation Guidelines under ECORTIS to create Implementation Guidelines.

Task 250 – Organisational Model/Guidelines:

The purpose of this task was to identify national organisations required for a service and their responsibilities in order to define a national organisational model and link this to the building blocks of the service. This would allow the definition of a model for legal entities around the service and lead to a description of the use of the function of the model for national application.

The output of this activity was the dissemination of results and consensus on the results at the January 1998 workshop in Cologne. Each national project then has the tools to check their implementation against the definitions and to allow them to create the appropriate national application on the basis of the models presented.

Quality Assurance

Task 310 – QA Models for Information Content:

The main tasks of this activity are:

- generation of user questionnaire, distribution to Member States and collation of results;
- identification of Quality Assurance Needs at User level;
- transformation of DEFI recommendations into practical and measurable “Quality Criteria”;
- identifying the key quality factors that affect information content;
- defining the types of QA “methods” that are available and which could apply to ALERT Services;
- presentation of results in deliverable 310.1 “QA Requirements for Message Content”;

There is no single “perfect” answer for how QA should be provided - user needs differ in different member states and there are also many different actors involved in the chain. Users want the QA system to apply across all the TMC services at a common core, to support the award of the TMC service logo, but also be tailored and maintained at a national level. This common core should include performance targets for the timeliness, accuracy and relevance of information.

Cost effective and useful systems are a key requirement and users do not feel that formal accreditation is necessary. Existing QA models, such as ISO, are generally orientated to products rather than services, but it is possible to pick the best ideas from a number of existing models such as ISO 9004-2 or TQM and apply them to RDS-TMC. A model that concentrates on the processes involved within the RDS-TMC building blocks is necessary and is suggested in this deliverable.

This QA model has layers that can be applied at European, member state or bi-lateral level. The European level must support the TMC services at the European level, whilst other layers can be tailored to suit national requirements. Protocols and standards, such as ALERT-C, will clearly apply across Europe.

QA manuals and procedures will be the key element of the model, and would apply at national level to advise actors on their roles and responsibilities. QA guidelines will apply at national and bi-lateral level, to advise on how the procedures can be put into practice and help with practical aspects. The QA Manual will be tailored to fit particular actors or interfaces between actors for use on a day to day basis.

It will be a “living document” and so the assistance of early national implementations in its development and, more importantly, improvement over time is welcome and necessary.

The main actions that arise from this deliverable are:

1. the proposal for the QA model should be adopted and developed further into one that can be used on a day to day basis, to improve the quality of the services; and
2. the success of the model in early Member State services should be monitored, to provide a feedback mechanism on what must be a “living document”

To allow the above to be fulfilled, the following further actions were taken.

1. Technical consensus was gained on these proposals by the project partners.
2. The proposal then gained wider acceptance through the Informal Standing Conference in September 1997.
3. Liaison with Sweden, as the first Member State to implement a service, began followed by wider discussions with other Member States.
4. The QA models used within RDS-TMC are dynamic and must change in response to user feedback. Whilst the FORCE-ECORTIS project can undertake this maintenance role in the short term, the future maintenance and support of the QA system and quality criteria needs to be discussed.

Task 330 – QA Requirements – RDS-TMC:

The purpose of this task is integration of Quality Criteria with ALERT service levels. This requires extending the QA models reported in deliverables 310.1 and 320.1 to define a reference system or “tool kit” that can be used by national services to validate their own quality of service. An analysis is necessary of the common QA elements in Europe, such as the unique understanding of what messages mean and the use of a set of key message types. The results are presented in deliverable 330.1 “Quality Assurance Requirements”.

This document supplies “tools” that assist the measurement and assurance of the quality provided by an RDS-TMC service. To do this, the quality criteria have been assessed and categorised into three levels, and the QA needs of service providers looked at in more detail.

One method of measuring quality could be a “reference scenario” and this should help avoid a poor quality service. Unfortunately, even if such a scenario were to be proposed, there is no way of ensuring that it would actually be taken up in practice. A better approach, adopted by FORCE-ECORTIS, looks at providing a “helping hand” with which the service may be guided to a higher quality. Such an alternative is the “tools”.

Tools have been developed containing specific questions that can easily be answered, to assess whether or not the individual criteria have been achieved. They also contain guidelines to help users to apply the criteria in practice. These tools have been used to support the national implementers.

Actions arising from this deliverable were:

- continuation of detailed discussions with those Member States undertaking early implementations to obtain feedback on their detailed QA requirements;
- contribution to the development by WA200 of the definitions of the basic safety and crisis event list (SACEL) that will be needed in the QA models to ensure consistency;
- further feedback on how the quality criteria have been prioritised and to ensure full consistency with the ALERT service specification This document was a “snapshot” of current work and so consensus was obtained on its recommendations;

- clarification of how variations in geographical coverage, particularly the TERN network and its components, affect the different levels of the ALERT service; and
- support to validation work in the application of the QA tools at a practical level and feedback from validation work on the applicability of the tools provided for service validation.

Task 350 – Support for QA Processes:

Operational support during the start-up of services is essential to make sure maximum feedback is obtained on the ideas and procedures and will concentrate on:

- defining support methods for the QA models and procedures for the information content;
- embedding the support process into European co-ordination mechanisms;
- reporting mechanisms and the mechanisms for initiating corrective actions.

The report from this task is deliverable 350.1, “QA Procedures for RDS-TMC and First Results”. Many actors in the TMC service chain have reviewed the QA procedures proposed in deliverable 340.1. Representatives of key actors in the service chain undertook this review at two levels – at the Quality Workshop in June 1998 and at a more detailed level. These reviews showed that:

- The procedures structure and format are essentially correct, with most of the comments being minor rather than major;
- Their depth and coverage was also correct and found useful by most reviewers; but
- More help is required in showing how to use the procedures in a practical sense and to “sell “ the procedures.

As part of this review process, key messages emerged that:

- Automatic data collection systems are not necessarily suitable for RDS-TMC just because they pass technical tests for the equipment – the data provided needs to be managed, checked and monitored to make sure it meets the needs of different users;
- “closing the loop”, so that operators can monitor off- air the messages they enter has great advantages for achieving and monitoring quality; and
- written support documents for TMC operations are highly valuable, including service level agreements and detailed procedures.

The procedures are therefore ready, with some minor modifications, to be used operationally in order to obtain the next and most important level of feedback - from those who will use the procedures on a day to day basis. RDS-TMC set manufacturers should also be made more aware of the procedures.

However, QA does not stop there nor with the completion of the next deliverable as it must be part of a process of continual improvement. The procedures must be maintained and updated following further feedback from operational staff and also to accommodate changes in such elements as the SACEL list.

This deliverable proposes that the QA procedures be maintained as part of the TMC Compendium. The support for this maintenance should be undertaken through the TMC Forum, as an integral part of their support work. The procedures can also be promoted in this way as a positive aid to ensuring quality, rather than a restrictive burden.

Validation

The assessment of the impact of RDS-TMC services is called the evaluation of RDS-TMC, and it complements the validation work being done using the Service Quality Assessment questionnaire.

There will be no direct assessment of individual services by the FORCE 3 project, instead, guidelines have been produced to help each service provider carry out their own service evaluation.

An evaluation may consist of the following elements:

- user acceptance: aiming to estimate users' attitude to and perception of an RDS-TMC service, via frequency of use, perceived benefits and willingness to pay.
- users' response: how and to what extent the RDS-TMC service affects users' behaviour.
- impact assessment: the estimation of the impact (effects) of the RDS-TMC service, particularly on safety and transport efficiency.
- usability: of the HMI and safety aspects related to HMI.
- socio-economic evaluation: estimate the net economic benefit of the RDS-TMC service over the existing situation.

The target groups for evaluation are the end user, public authority organisations (such as the police), service providers, TIC operators and broadcasters. Each target group requires different approach and contributes to different elements of the evaluation.

Task 420 – Evaluation Framework – Impacts:

Two different types of service are envisaged: one when the service is still being tested and one with a full service and “market conditions”. The questionnaires differ according to the service type.

The Evaluation support gives recommendations on how to assess each of the different elements of an evaluation. It includes:

- a detailed trip log: for use in test conditions, where there is greater control over the users; this is a log of journeys over a week period to assess the users' response to RDS-TMC.
- end-users' extended questionnaire: for use in test conditions to assess the usability of the HMI, and users' acceptance of, and response to RDS-TMC.
- a short end-users' questionnaire: designed to fit on a postcard, for market conditions, to assess user acceptance of, and response to RDS-TMC, at a less detailed level. It should be mailed to a sub-set of people buying TMC receivers.
- a questionnaire for institutional organisations: to assess the service impact, according to these other groups (not available yet). This will help assess how the police and other organisations view the impact of RDS-TMC.
- detailed guidelines on how to carry out a Cost Benefit Analysis: according to agreed guidelines developed under the EVA Project adapted for RDS-TMC services. The recommended model is given including all of the costs and benefits to be included in the impact groups: Drivers, passengers and freight; Community; operators and suppliers. This brings together the results of the other questionnaires to provide the Net Present Value benefit of an RDS-TMC service

As well as these questionnaires and guidelines, recommendations are given on how to employ them. For example, guidelines are given with the end users' assessments on how to provide control information, in order to compare results between those using RDS-TMC and those without it.

Task 440 – Apply to National Service Impact Plans:

The questionnaires and supporting guidelines are given as a package that each service provider can use and adapt to their own situation as necessary. The objective is to provide support for service evaluation, and also a common framework. Those services that do use this information can provide Work Area 400 with feedback, in order to develop an overall picture of the impacts of services. Use of the templates described will obviously aid WA 400 in collating information from different service providers.

Task 460 – Integrate into European Impacts:

Following the publication of these guidelines, the role of FORCE 3 is to provide “background support” in carrying out evaluation, and to collate results, where they become available, for presentation in the final deliverable 450.1 “Evaluation Results”.

A Europe-wide approach has been followed identifying a set of overall criteria to which national or regional services should comply. Individual services have been in a step-wise process of implementation by the national teams and organisations, whereas FORCE-ECORTIS co-ordinated all aspects that were required at the European level.

FORCE supported evaluation actions in order to arrive at as harmonised as possible an approach across Europe. This would allow conclusions on the acceptance and impacts of the RDS-TMC service at the European level. The support was given in various respects:

- in the form of general recommendations;
- in the form of detailed instruments to perform the assessment;
- by collecting national data or reported results to provide a synthesis at the European level.

Anticipating the divergent implementation stages of RDS-TMC services, both a minimum approach for service operation in market conditions and an extended approach for test situations were developed.

The results presented in this report represent individual services in DK-TMC (Denmark), Finland, Sweden, SERTI service in Spain, and the Regional service Rotterdam/Rijnmond Netherlands. These are services in different stages with the Danish service is a regular operating service and the other services operating under test conditions. The evaluation results are divided into those related to the acceptance of the service and those related to impacts of the service operation.

End-users were the main category to assess the service quality and the impacts. However, institutional users like national authorities and TIC's are also relevant when assessing the service. All sites addressed the end users. Institutional users haven been included in the study design in Denmark.

RDS-TMC services meet basic acceptance criteria such as actual use by drivers who have an on-board TMC receiver, comprehensibility of information and level of satisfaction with the service. Nevertheless, there are areas for improvement in order to reach a still higher level of end-user acceptance. Quality of information is a major area. However, the data collection process that influences the information quality is not inherent to RDS-TMC service as such. The fact that drivers experience quicker reception of messages through TMC compared to the traditional radio traffic information services contributes substantially to user acceptance.

A substantial aspect of RDS-TMC services is the capacity to inform. Drivers exposed to TMC information feel better informed. Almost one-third of the drivers claim to be considerably better informed. At the trip level, TMC service results in a higher percentage of trips in which the driver is well informed. This observation is consistent with the result of previous tests. Considerable traffic efficiency impacts due to TMC information were experienced by 10% to 20% of the drivers.

Effects of the sister projects

Overall arrangements to manage across different programmes

The original concept was for a single project. This was modified in negotiation with Commission services to cover a number of programmes. It is, therefore, important to take on board the achievements of the related projects in the other programmes.

Specific Achievements of the ECORTIS Project

Project management

Identical to FORCE 3 except for the focus on managing the ECORTIS project and Strategic and Political Co-ordination. For this latter aspect, The project created a coherent structure, including stronger links to the political level, such as the EU High Level Group Road on Road Transport Telematics through two groups:

- The ALERT Steering Group to provide strategic advice to the projects and act as a conduit to the political level.
- The National Projects Platform to co-ordinate national implementation project activities.

ECORTIS created the European organisation (the TMC Forum) that would eventually take over the work of the Steering Group, the National Projects Platform and the projects themselves. In addition, ECORTIS drafted much of the RDS-TMC part of the main output of the High Level Group: the Community Strategy and Framework for the Deployment of Road Transport Telematics in Europe. The European Memorandum of Understanding for RDS-TMC services with ALERT (i.e. European) functionality signed by 14 states and 24 private organisations was jointly drafted by ECORTIS and the Commission services. The TMC Forum has been set up on the basis of the Memorandum of Understanding.

Definition & Specifications; Organisation

European Service Description was based on the DEFI Reference Position Document leading to a deliverable “Definition of an RDS-TMC Service to EU Requirements” including:

- a technical approach with a description of the building blocks;
- a service characterisation with an attempt to describe the content of the service; and
- an organisation of the actors with a description of possible organisational schemes both at the local/national level and at the European level.

Service Architecture Definition is the architecture of the service rather than the underlying systems (defined in FORCE 3). It was an essential task in order to be able to provide the European Service Description and involved:

- defining each of the building blocks of a service;
- creating an organisational template over the building blocks;
- defining responsibilities and tasks of the building blocks;
- establishing the scope of the service from data collection to the receivers.

Understanding the way in which receivers will behave is essential for the definition of the service. This task created a specification of critical receiver functions (a working document rather than a deliverable) in relation to the objectives of the European elements of the services. The universal behaviour of the receiver in critical functions was reviewed at a series of meetings with receiver manufacturers. The sensitive and confidential nature of this work meant that results could not be published, but it provided the project leaders with sufficient knowledge to be able to ensure that the service definitions took account of receiver behaviour.

The concept of SACEL (Safety And Crisis Event List) was developed to allow both service providers and receiver manufacturers to distinguish between the full ALERT-C event list and events that relate specifically to safety and crisis for the end-users. A “Safety And Crises Events List” was produced.

“Implementation Guidelines for RDS-TMC” combined the installation guidelines that cannot stand alone without a close relationship to the operational guidelines (a task in FORCE 3).

Data exchange is a fundamental pre-requisite for interoperable and continuous services. Therefore, it was decided to create a specific task that allowed the RDS-TMC community to specify its requirements towards the Data Exchange (DATEX) community and to take appropriate action to ensure that the feedback from the DATEX world was incorporated into TMC. A deliverable “Requirements of RDS-TMC for Data Exchange” was produced and the TMC Compendium also includes valuable information on this aspect.

European Operational Co-ordination provided the technical backbone on which the Strategic and Political Co-ordination was able to create the European Co-ordination. It identified European organisational requirements for service and European level responsibilities and defined a European organisational model and linked this to the national models. The deliverable of this task was “European Organisation;

Operational Issues”. These issues now form the basis of the tasks undertaken at the national level and through the TMC Forum at the international level.

Location Databases Distribution with its deliverable “Location Database Distribution” carried out a number of important activities to allow the owners and distributors of location code databases to operate at a co-ordinated level. Firstly, the requirements were analysed for the production and distribution of the location databases. Then an update method and calendar were defined for distribution. How to embed these in the national organisations was described, as were tasks for European co-ordination.

Quality Assurance

The project agreed what “quality” means by way of criteria and then put in place Quality Assurance (QA) systems that help each national RDS-TMC implementation to meet the needs of drivers. The deliverable “European Criteria for Quality Assurance” assesses existing models for QA of services, identifies an RDS-TMC Quality Assurance Model and assesses issues affecting service quality, by looking at current services. The main actions in this task have been to define the quality criteria, then to identify parameters and targets for them. Another action has been to ensure that the criteria meet user expectations, so that they become a useful tool for the future.

Once QA systems are running (created under FORCE 3), the following activities enabled first audits and have led to permanent arrangements:

- defining monitoring methods for the RDS-TMC services;
- embedding in European co-ordination;
- link to monitoring and support process of other telematics services and to the evaluation work area.

European Work Plan

The Users’ Perspective :

- described the RDS-TMC traffic information service as a users tool;
- showed the added value and gave a comparison with other traffic services;
- identified the marketing mix for RDS-TMC in qualitative terms; and
- identified the strengths and weaknesses, costs and benefits from the users point of view.

In order to be able to compile national work-plans on a basis that allows for comparison it was necessary to create a common framework, known as the Generic Work-plan”. To create the European Workplan it was first necessary to compile national work-plans on the basis of the generic work-plan. Each country thus was required to deliver its national work-plan. These were then combined into a EU Work-plan to provide “seamless” European wide services. The European Work-plan forms part of the TMC Compendium; it describes the technical, organisational and institutional issues of implementing TMC services. It includes specifications for a minimum level of service.

The commitment of actors to RDS-TMC is essential if services are truly to spread and not become fragmented into niche markets. The main activities were:

- communication of all relevant plans and dates (achieved through the publication of a glossy booklet for the 1997 ITS World Congress, and by creating European maps and tables that have been included in various documents, various presentations and on the web sites);
- identify roles and positions of all actors (generally achieved in other tasks but communicated through this task);
- identify critical factors and motivating stimuli;
- action list for all actors including actions for the projects.

These activities were progressed at a number of meetings and workshops, plus the opportunity used at various conferences. The key activity was to hold a TMC Launch Conference in September 1997 where the concept of the Memorandum of Understanding was presented and agreed. A further activity in this task was to review the use of TMC on future media in view of some destabilising comments made in various quarters delivered in “Future Media”.

Transfer and Co-ordination with National Projects related to the need to ensure good co-ordination between the national projects and the ECORTIS-FORCE projects. The NPP was set up to assure this transference and co-ordination. The participants in these tasks have often stated how invaluable this has been for the introduction of services and for maintaining commitment to TMC in their own countries. This usefulness can be gauged by the fact that the national projects continue to meet under the aegis of the TMC Forum and without funding support from the European level.

The CEN-English description events list has been transformed into each language according to common guidelines and presented in the “Events Lists of the Member States initial issue and updated during 1998.” The RDS-TMC event list has been issued as pre-standard prENV 12313-2 (now a full ISO ENV). This event list gives the CEN-English “technical language” description of each code, followed by the code. The pre-standard states that the “appropriate authorities” of each country are responsible for the exact description in each Member State language. This is to ensure precise definitions and the correct use of the event codes in the transmission layer.

Spread Knowledge

Workshops organised with FORCE 2 provided the basis for dissemination (i.e. teaching) and ECORTIS provided the basis for accumulation of knowledge (i.e. learning). The challenge of the FORCE-ECORTIS projects was a complex one. In a relative short period of time, technical developments needed to be finalised, standards be agreed upon, operational, organisational and political issues solved and the implementation of the services in the participating Member States carried out. This could only be achieved when all the participants share their information and have access to all the know-how in and outside the project. Eight major workshops were held.

Book of Requirements (later known as the TMC Compendium)

The TMC Compendium is the fundamental output of the projects, bringing together all the material and results from FORCE-ECORTIS and preceding RDS-TMC projects, in a user-friendly form. The Compendium contains all available and relevant information on RDS-TMC in general and services in particular. Through this completeness the Compendium functions as a reference basis for the Memorandum of Understanding on RDS-TMC.

The following activities made up the collection phase:

- objectives, users and editors of the TMC Compendium;
- identification of all issues;
- relation to standards and other handbooks, etc.; and
- collection of all contributions for the TMC Compendium.

The components of the TMC Compendium were produced by different authors and teams of experts. It is essential that these were stylised in a common fashion:

- identify authors for the issues in the TMC Compendium;
- install quality assurance process for the writing of the TMC Compendium;
- compile the content of the book and obtain consensus;
- edit the contributions.

The Compendium was issued as a paper document in 1997 but the experience gained from this in organisational terms and in sheer wastage of paper convinced the projects management team that the Compendium should be a truly living document accessible only for the Internet. Thus, it was placed on the web site and now it has been transferred to <http://www.tmcforum.com> under Technical/TMC Compendium. It is fully open with no password protection.

Once the TMC Compendium became available it needed be safeguarded for the life of the services by:

- analysing the use and the users of the TMC Compendium;

- identifying and agreeing upon the owners of the TMC Compendium in Europe and nationally;
- defining and installing an update mechanism for the TMC Compendium.

Detailed statistics were kept on the users and their use (more than 250 regular users were identified). This helped in determining the correct format for the Compendium in terms of layout of parts and indexing. It was agreed that, albeit a voluntary group, the TMC Forum should be the owners, facilitated through ERTICO as the TMC Forum Co-ordinator.

Specific Achievements of the FORCE 1 Project

Quality Assurance

Creating day to day operational procedures concentrated on these main activities:

- creating detailed procedures on the basis of the QA models;
- co-ordinating with other traffic information procedures (from TICs, etc.);
- defining which procedures apply nationally and which on a Europe Wide basis;
- embedding these procedures into national and European organisations.

The deliverable “Report on QA Operational Procedures” allowed detailed feedback to be collected so that these procedures can be used:

- by existing national services, as a first test to check out their validity and practical applications; and then used;
- to guide Member States currently developing services on those areas where attention may be required.

Validation

One of the main objectives of FORCE-ECORTIS projects is to validate the RDS-TMC service (FORCE 1) offered and to assess its impacts (FORCE 3). The validation work goes through two main stages which will run in parallel until the realisation of TMC services. First, the technical qualities of this service have to be tested and then introduced in operational form. The two validation stages are as follows:

- verification stage (FORCE 1): technical assessment of the TMC services to establish that it performs to the agreed common denominator and achieves agreed quality values; and
- evaluation stage (FORCE 3): a site independent evaluation of user acceptance, service impact and socio-economic aspects.

The Evaluation Framework for Service Assessment contained a plan for validation of the RDS-TMC service, focusing on the service quality assessment (verification). Four categories of assessment are included: technical assessment of the service quality, user acceptance assessment, impact assessment and socio-economic evaluation. A pre-assessment is given by identifying the impacts expected from service implementation. Finally a general integration framework is provided for the respective national validation results.

The objective of Service Quality Assessment (SQA) is to retrieve information from each national service about the technical quality of the service being designed, implemented and/or operated, concentrating on those aspects that are part of European functionality. Six SQAs have been completed. The results for the SQAs for those quality criteria that are quantifiable are:

Level of Services	<i>Yes</i>	<i>No</i>	<i>avg</i>
Essential requirements met	4	1	
Fulfilment of enhanced features	5		74%
Fulfilment of advanced features	5		53%

European Work-Plan

Liaison teams recorded the status of each implementation or demonstration and the need for additional work to meet common European elements. Each country has been visited on several rounds and an inventory of the nature and status of the service(s) has been made, allowing the technical chain to be fed into the European Work-plan.

Service Requirements for Member States uses input from the liaison teams to allow the technical chain to feed into the European Work-plan and consequently feed technical work throughout the project. The general conclusion is that common European requirements are related to technical issues, more than organisational or financial issues. However all countries felt the need for European co-ordination, particularly those close to implementation.

Finalise Developments

All development issues of the RDS-TMC related protocols (ALERT-C and ALERT-Plus) were dealt with plus support to the standardisation bodies and acceleration of the standardisation process. The Technical Basis for Standards was basically the means to bring to the appropriate CEN working group (CEN TC278 SWG4.1) all the experience of the projects in finalising the standards for TMC (EN12313) in its five parts.

Location Referencing Rules were created by a process that included a workshop to identify known practices for location referencing, a detailed survey of practices throughout Europe and through a series of meetings. This expertise was brought to the appropriate CEN working group (CEN TC278 SWG7.3) to finalise the location referencing standards.

Tuning Information and adaptation to the RDS Open Data Application worked out the input for standardisation of the TMC Service, which has found consensus amongst the FORCE-ECORTIS partners plus additional experts from the broadcasting world. A basic and an enhanced mode of transmission are defined describing timing parameters for broadcasting and synchronisation between available windows and the search and measuring intervals. The results of this work were forwarded to CEN 278, SWG 4.1 leading to the ENV that was forwarded to CEN in June 1997.

ALERT-Plus aimed to find technical solutions or give answers for an ALERT C with ALERT Plus based service. A deliverable was produced where the ALERT Plus function is described, how ALERT-C information and ALERT Plus information are complementary, and what are the levels of service envisaged. The results of this work have been forwarded to CEN TC 278 SWG 4.1.1 for the part related to the coding protocol and CEN TC 278 SWG 7.3 for the part related to the location referencing.

The Universal Encoder Communications Protocol, developed by public broadcasters to handle the communications between broadcasting centres and transmitters, was developed with RDS in mind but

required some adaptation to handle TMC. Recommendations were made to the EBU after joint meetings with the UECP protocol modified on the basis of these recommendations.

RDS-TMC relies on a number of external influences that were handled by the project, including:

- Broadcasting TMC in mountainous areas.
- Specific weather and road surface messages for Nordic countries.

The standard that defines the ALERT-C coding of traffic messages contains only the bare facts, and only a few explanation and even less justification. Thus it gives little help in understanding the rules that are given, and no help in understanding why the rules were given as they are. The ALERT-C Coding Handbook aims at filling these gaps. It presents examples on how the protocol can be used, explain why several rules and limits were defined as they are, and also give hints and guidelines on how to use the parameters that are available for the fine-tuning of the system.

Spread Knowledge

A specific advisory team was composed for each country and a liaison strategy made following experience gained in the first round of visits. The following activities were carried out:

- validation of a basic information set, which will be handed to the countries, at, or just before, the kick-off meeting;
- visits to countries for secondary meetings and to start the transfer of knowledge;
- inventory of needed support per country based upon the national plan;
- allocation of available person-months and experts to countries in balance with the national planning; and
- twice-annual visits to countries by the advisory teams to make an inventory of the progress.

The value of these liaison team visits cannot be gauged in quantitative terms, but the national projects have clearly stated that the exercise was essential in providing practical support in ensuring that their services conform to European requirements.

FORCE-ECORTIS have carried out a wide range of promotional activities including brochures and fact-sheets, presentations at conferences and congresses, articles in professional magazines, the web sites, and the promotional task force. Brochures and demonstrations have supported Commission activities at the ITS World Congresses. Fact-sheets on current TMC services and products and a generic brochure has been produced to introduce and explain TMC to the general public. Presentations have been made at a large number of conferences.

Specific Achievements of the FORCE 2 Project

Spread Knowledge

Dissemination of Knowledge used the following supporting mechanisms:

- International Call Desk;
- Web-site;
- Newsletter; and
- Workshops.

The Web site contained a public part where general information was provided, and many links to home pages of partners, related projects or other interesting home pages. Project partners had access to a dedicated work area, which allowed project partners to communicate electronically.

Nine issues of the newsletter have been released, containing information on national implementation, results of workshops and technical issues dealt within the project.

A large number of workshops have been organised. A network of specialists, each having on-hand experience in RDS-TMC and related subjects, operated in dissemination groups. Specialists with experience from the previous. The specific need for know-how in each Member State was surveyed. The

results were used to form an array showing these needs by country: 'who needs to know what'. A similar array showing existing know-how by country, 'who knows what' was used to match.

Book of Requirements (now known as TMC Compendium)

The knowledge created through previous programmes and in FORCE needed to be protected and made available in a stable and useful format. A mechanism was developed to safeguard knowledge and experience for the benefit of all users and for future generations. This mechanism was applied to the end of the projects with recommendations made for extending safeguarding beyond that period. A work group was installed to develop a mechanism for Safeguarding knowledge and the TMC Compendium as the Compendium is a part of the knowledge created in this and previous projects. This work group monitored the use of the Compendium and identified topics that have to be addressed by the Work Area to serve all the expected users.

6. CONCLUSIONS

The FORCE-ECORTIS projects co-ordinated the research and implementation of a network of RDS-TMC services throughout Europe. It has fully observed the principles of subsidiarity by leaving actual implementation to the national level, where it can best be handled. Co-ordination has contributed to the delivery of continuity of services, an essential element of interoperability that is in itself a major European policy objective. This has clearly demonstrated that ITS services have the potential to benefit from interoperability, with clear advantages for delivering European Policy Objectives:

- integrity of the TEN-T network (Section 132 of the Treaty of the European Union) by providing a road traffic management application throughout the network;
- continuity of services across borders, with the foundation provided by ECORTIS and to be delivered through the Euro-regional projects;
- compliance with the Community Strategy and General Framework for the Deployment of Road Transport Telematics in Europe, for both the first priority action and by extension through encouragement of other priority actions including information management (specifically data exchange and the Human-Machine Interface);
- a significant boost to employment through the creation of manufacturing output for, in particular, receivers;
- exploitation of significant research and development carried out in Community Sponsored programmes (Second, Third and Fourth EU programmes).

The language independence of RDS-TMC is a particularly relevant function that benefits from the coded nature of the system. Ten of the eleven main community languages (Greek being the exception because of a lack of interest in RDS-TMC in Greece due to the absence of traditional inter-urban traffic problems, as is the case in Ireland) have had the traffic message set, known as the Event List, transformed. This allows users to receive the RDS-TMC Service in their chosen language, regardless of where they are in Europe. This is a major achievement for a cohesive and integrated TEN-T network.

RDS-TMC is seen by all of the ITS community as a “torch bearer” for future ITS services and products. These will need to stand the test of the European advantages of RDS-TMC whilst benefiting from the major investments made in and for RDS-TMC. The increasing difficulty in achieving transport infrastructure projects of a traditional nature, particularly new or improved highways, points towards increasing future emphasis of ITS in European policy objectives.

The TMC Forum shall be responsible for all further work at the European Level. The TMC Forum Assembly has membership open to all public and private organisations that have a clear interest in TMC and support the objectives of the Forum. No membership fee is envisaged at the starting phase for the normal efforts of the Forum. Funding necessary for tasks requiring additional efforts will be defined on a case-by-case basis by the Forum membership.

ANNEXES

For further details consult the web site of the TMC Forum: <http://www.tmcforum.com>