COMMISSION OF THE EUROPEAN COMMUNITIES

COM(77) 74 final
Brussels, 17 March 1977

Proposal for a

COUNCIL DECISION

subscribing, on behalf of the Community, to a joint declaration of intent to implement a European project in the field of transport on the subject: "Electronic traffic aids on major roads"

(COST Project 30)

(submitted to the Council by the Commission)

EXPLANATORY MEMORANDUM

Eleven European States, including six Member States of the Community and the Community itself, have finalized a programme for a joint research project on "Electronic traffic aids on major roads" (Project 30). A joint declaration of intent to implement this programme has been submitted for signature to the 19 COST States and to the Community.

I. The main points of the programme :

(a) Objectives :

- development of techniques for the control and realtime management of road traffic ;
- the establishment of a testing programme, or any other project aimed at defining a system of electronic traffic aids for major roads which could be standardized and submitted to the European Governments.

(b) Methods :

A research and development programme and joint studies by the relevant national laboratories of the participating countries.

II. The time allowed for the work is three years and may be extended by joint agreement between the participating countries.

III. In its opinion, delivered an 16 and 17 April 1975, CREST :

(a) recognized that the project was of interest to the Community;

(b) emphasized that work on drafting the agreement should be continued under the auspices of COST in order to avoid the further long delays which could result if it were transformed into a Community programme with which non-Community COST countries could be associated.

(c) stressed the need for the Commission to be closely associated at all stages of the project particularly the drafting of recommendations on a European standard for a system of electronic traffic aids for major roads;

(d) expressed the hope that all the Member States would accede to this agreement.

IV. On 5 and 6 November 1975, following a proposal by the Commission, the Council authorized the Commission to negotiate Community participation in this action programme on the basis of the following directives :

(a) participation by the Community as such must not include any financial contribution from the Community ;

(b) the Community is to be represented on the Management Committee by the Commission.

- During the negociations held from November 1975 to September 1976, the detailed rules for the implementation of the project underwent major changes. For the phase covered by the draft agreement there is now no longer any provision for joint experiments carried out in areas to which the public has access. It will therefore no longer be necessary to set up a joint fund to finance the project.

  Under these circumstances the participating States and the Community have limited their commitment to a joint declaration of intent whose entry into force is not subject to ratification by the national parliaments.

- As a result of the negociations the Community's contribution to this action will involve :
  - attendance at meetings of the Management Committee and participation in the preparation of its work ;
  - participation in the work of a specialist group on the development of an appropriate terminology for traffic messages.

V. In view of the opinion delivered by the Scientific and Technical Research Committee (CREST) and the agreement reached between the Commission and the Committee on European Cooperation in the field of Scientific and Technical Research (COST), the Commission proposes that the Council should adopt the appended decision to which the joint declaration of intent is annexed.

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COUNCIL DECISION

Subscriving on behalf of the Community, to a joint declaration of intent to implement a European project in the field of transport on the subject : "Electronic traffic aids on major roads(COST Project 30).

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 75 thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Having regard to the Opinion of Economic and Social Committee;

Whéreas the aim of COST Project 30 is to establish a standardized European system designed to make more efficient use of the road infrastructure and improve road safety;

Whereas in particular this project will have repercussion on the common transport policy;

Whereas it is therefore appropriate that the Community should participate in the execution of COST Project 30;

Whereas the Scientific and Technical Research Committee (CREST) has stated in its Opinion of 16 and 17 April 1975, that it is in favour of such participation;

HAS DECIDED AS FOLLOW :

Article 1

On behalf of the European Economic Community, the joint declaration of intent to implement a European project in the field of transport on the subject "Electronic traffic aids on major roads" (Project 30) is hereby s..b-subscribed to.

The joint declaration of intent is annexed to this Decision.

Article 2

The President of the Council is hereby authorized to nominate those persons empowered to sign the agreement, and to confer upon them the powers necessary for commiting the Community.

Article 3

On the Management Committee in respect of the project the Community shall be represented by the Commission.

Done at Brussels,

For the Council
The President

European Co-operation
in the Field of Scientific and
Technical Research
- COST -

Secretariat

Brussels, 4 October 1976
COST/49/1/76

MEMORANDUM OF UNDERSTANDING ON THE IMPLEMENTATION OF A EUROPEAN PROJECT ON ELECTRONIC TRAFFIC AIDS ON MAJOR ROADS (1)

(Project 30)

The Signatories to this Memorandum of Understanding, declaring their common intention to take part in a European project for the development of electronic traffic aids on major roads, have reached the following understandings:

Section 1

1. The Signatories intend to co-operate in a project to promote research and development in the field of electronic traffic aids on major roads with the aim of studying the various techniques developed to this end, and their compatibility. This project is also intended to ensure that these various methods are made available, as far as possible, in all the countries signatory to this Memorandum, the ultimate aim being to work towards the possible establishment of a standard European system in this field.

(1) This text has been finalized in the various languages by the Working Party of Legal/Linguistic Experts in accordance with the decisions of the Committee of Senior Officials on Scientific and Technical Research at its meeting on 16 September 1976.

2. The project will be concentrated primarily on research into, and development of, methods of communicating with drivers and the selection and development of prototypes to be used for this purpose.

3. A general description of this research programme is set out in Annex II.

The Signatories hereby declare their intention of carrying out the research programme jointly, in accordance with the break-down indicated in Annex II, adhering as far as possible to a timetable to be decided by the Committee referred to in Annex I.

The project will be carried out through concerted action, according to the provisions of Annex I.

The cost of this programme is estimated at approximately 5 million units of account (1) at 1976 prices.

The Signatories will make every effort to ensure that the necessary funds are made available under their internal financing procedures.

(1) The unit of account used is that defined in Article 10 of the Financial Regulation of 25 April 1973 applicable to the general budget of the European Communities (see Official Journal of the European Communities No L 116, 1.5.1973, p. 1)

Section 2

Signatories intend to take part in the project:

(a) by carrying out directly studies, research and development in their technical services or public research establishments (hereinafter referred to as "public research establishments"); or

(b) by concluding contracts for studies, research and development with organizations (hereinafter referred to as "research contractors"); or

(c) by seconding experts or supplying any other service; or

(d) in several of the above ways.

Section 3

1. This Memorandum of Understanding will take effect for three years upon signature by at least five Signatories. It may be extended by arrangement between the Signatories.

2. This Memorandum of Understanding may be amended in writing at any time by arrangement between the Signatories.

3. A Signatory which intends for any reason whatsoever to terminate its participation in the project may do so after having given written notification of such intention to the other Signatories at least three months beforehand.

4. If at any time the number of Signatories falls below five, the Committee referred to in Annex I will examine the situation which has arisen and consider whether or not this Memorandum of Understanding should be terminated by decision of the Signatories.

Section 4

1. This Memorandum of Understanding will be open for signature for a period of six months from the date of the first signature, by the Governments which took part in the Ministerial Conference held in Brussels on 22 and 23 November 1971 and also by the European Economic Community.

2. After this period of six months has elapsed, applications from the Governments referred to in paragraph 1 or from the European Economic Community to sign the present Memorandum will be considered by the Committee referred to in Annex I, which may attach special conditions thereto.

3. Any Signatory may designate one or more competent public authorities or agencies ([1]) to act on its behalf, both in respect of the implementation of the programme and in respect of the ensuing rights and obligations.

Section 5

This Memorandum of Understanding will be deposited with the General Secretariat of the Council of the European Communities. The Secretary-General will transmit a certified true copy to each of the Signatories.

IN WITNESS WHEREOF the undersigned Representatives have signed this Memorandum of Understanding.

Done at Brussels,

For the Government of .....,
For the Government of .....,

([1]) The phrase "competent public authorities or agencies" does not include industrial undertakings.

ANNEX I

CO-ORDINATION OF THE PROJECT

I

1. A Management Committee (hereinafter referred to as "the Committee") will be set up, composed of not more than two representatives for each Signatory. Each representative may be accompanied by such experts or advisers as he may need.

As long as the European Economic Community is not a Signatory to this Memorandum of Understanding, a representative of the Commission of the European Communities may attend Committee meetings as an observer.

2. The Committee will be responsible for co-ordinating the project and in particular for making the necessary arrangements for:

(a) the choice of research topics, including any changes in those provided for in Annex II and the selection of topics from the proposals submitted by the competent public authorities or agencies of the Signatories with the aim of standardizing electronic traffic aids on European major roads;

(b) keeping abreast of the research being done in the territory of the Signatories and in other countries;

(c) exchanging the research results to the extent compatible with adequate safeguards for the interests of Signatories, their competent public authorities or agencies, and research contractors in respect of industrial property rights and commercially confidential material;

(d) advising the research contractors on the direction that work should take;

(e) drawing up the annual interim reports and the final report to be submitted to the Signatories and circulated as appropriate;

(f) dealing with any problems that may arise out of the execution of the project, including, if necessary, special conditions to be attached to applications to sign this Memorandum of Understanding more than six months after the date of the first signature.

II

1. Signatories will invite public research establishments or research contractors in their territories to submit proposals for research work to the competent public authorities or agencies of the Signatory to which they belong. Such public authorities or agencies will submit the proposals they accept to the Committee.

2. Signatories will require public research establishments or research contractors, before the Committee takes any decision on a proposal, to submit to the public authorities or agencies referred to in paragraph 1 a notification of previous commitments and industrial property rights of which they are aware and which might preclude the fulfilment of the projects of the Signatories under this Memorandum of Understanding.

III

1. Signatories will require their public research establishments or research contractors to submit periodic progress reports and a final report.

2. These progress reports will be confidential and circulated only to the representatives of the Signatories on the Committee. The final reports on the results obtained will have a much wider circulation, covering at least the Signatories' public research establishments or research contractors concerned.

IV

1. Subject to national law, Signatories will ensure that the owners of industrial property rights and technical information resulting from work carried out in implementation of that part of the project assigned to them pursuant to Annex II (hereinafter called "the research results") will be under an obligation, if so requested by another Signatory (hereinafter referred to as "the applicant Signatory"), to grant to the applicant Signatory or a third party nominated by the applicant Signatory, a licence to use the research results and to supply the technical know-how necessary for such use if the applicant Signatory requires the granting of a licence for the carrying out of:

- work in respect of this project; or

- the applicant Signatory's projects relating to traffic on its major roads; or

- any associated European project undertaken subsequently to develop electronic traffic aids on major roads, in which all the Signatories, or several of them, may be prepared to take part.

Such licences will be granted on fair and reasonable terms having regard to commercial usage.

2. Signatories will accordingly insert clauses requiring the granting of the licences referred to in paragraph 1 in any contract which they place with research contractors for study, research and development work to be carried out in the execution of this project.

3. Signatories will make every effort, in particular by including clauses in contracts placed with research contractors, to provide for the licence referred to above to be extended on fair and reasonable terms, having regard to commercial usage, to industrial property rights notified in accordance with Chapter II (2) and to prior technical know-how acquired by the research contractor insofar as use of the research results for the purposes referred to in paragraph 1 above would not otherwise be possible. Where the research contractor is unable or unwilling to agree to such extension the Signatory will, before the contract is concluded, give the Committee the opportunity to state its position.

4. Signatories will take any steps necessary to ensure that the fulfilment of the conditions of the present Chapter will not be affected by any subsequent transfer of rights to ownership of the research results. Any such transfer will be notified to the Committee.

5. If a Signatory terminates its participation in the project, rights of use which it has granted or is obliged to grant to or has obtained from other Signatories in application of the present Memorandum of Understanding and concerning work carried out up to the date on which the said Signatory terminates its participation will continue thereafter.

6. The conditions of paragraphs 1 to 5 will continue to apply after the period of operation of this Memorandum of Understanding has expired and will apply to industrial property rights as long as these remain valid, and to unprotected inventions and technical know-how until such time as they pass into the public domain other than through disclosure by the licensee.

ANNEX II

TECHNICAL ANNEX TO THE MEMORANDUM OF UNDERSTANDING

INTRODUCTION

1. This Technical Annex presents the research programme currently regarded as necessary. It also refers to the research in hand or planned in various countries. Such research contributes substantially towards the implementation of the programme. The figures given for costs are estimates. They cover the work required to achieve the research described in the Topics.

2. This research programme is to cover a period of 3 years.

The advisability of proceeding to a demonstration or any other important test will be assessed after 2 years and a report will be drafted in this connection. This report will comprise cost analysis and a timetable.

3. Other contributions still need to be decided on if the desired objectives are to be attained. Furthermore, new research proposals relating to the objectives of the programme may be incorporated in it.

TOPIC 1

Local aural communication inside vehicles

1 - Aims

To define and develop a local aural communication system intended for motor vehicles and suitable for standardization at European level.

2 - Programme

2.1 In conjunction with Topic 5, study of the respective advantages of the fixed and mobile transmitter systems.

2.2 Development of message-storage devices (cassettes, digital devices, etc.).

2.3 Operation of high-frequency loop or single-wire aerial systems under different environmental conditions : metal bridges, snow, salt water, etc.

2.4 Operation of radiative coaxial cables at VHF-UHF in different environmental conditions ; study of the "triaxial" cables tested in Los Angeles.

2.5 Interference between transmitting stations working in several languages.

2.6 Influence of vehicle noise on message intelligibility.

2.7 VHF-and UHF transmission in tunnels.

2.8 Effects of aural communications on the driver. Comparison with the internal visual system in conjunction with Topic 2.

2.9 Discussions with the CEPT to obtain frequency bands that could be used for these systems on a European scale.

3. Timetable

The research programme on Topic 1 is virtually at a standstill for the time being, because the participating countries feel it is preferable to wait for the results of research on Topic 5 before continuing the development of equipment for local aural communication with vehicle drivers.

In these circumstances, this research programme will not start until towards the end of 1977 and should then carry on for about 18 months.

Only section 2.7 (transmission in tunnels) is currently being studied (in Belgium).

4. Cost : about 0.6 MUA at 1976 prices.

5. Participating countries : The active participation of the following countries is planned:

Federal Republic of Germany, Belgium, Italy, United Kingdom and France (co-ordinating country).

6. National research programmes

6.1. United Kingdom

1. A prototype storage device for aural messages in solid state has been developed. More detailed research is still required on sentence formation, word selection, and the effects of the band width of the signal and noise on message comprehension.

2. Tests on a low frequency inductive loop have been carried out in the following conditions:
   a. Loop placed on road surface
   b. Loop and single-wire aerial buried in soil
   c. Loop suspended from steel safety barrier

3. Prototype low frequency transmitter-receivers have been designed and built.

4. Tests on coaxial cables have been carried out at low, medium and very high frequency in normal environmental conditions. A study of the influence of environmental conditions on motorways must still be carried out.

5. Measurements have been made of the noise spectra encountered in various types of vehicles, and of the effects on intelligibility of the reduction of the spoken message band width when the vehicle is in motion.

6. Laboratory tests have been carried out in order to compare the degree of attentiveness of drivers to aural and visual messages. The effect of aural routing information has been tested on a small scale on drivers in town.

7. Enquiries are being made with the police authorities to estimate their mobile transmitter communication requirements.

8. Future programme: All these studies mentioned above have been completed or are in process of completion.
No new research programme is planned in the immediate future on Topic 1.

6.2 Federal Republic of Germany

1. An HF loop system has been tested on the Hanover area since 1964.

2. Studies have also been made on the utilization of VHF or UHF frequencies for local communication systems, but have produced no results yet. The railway authorities have been experimenting with transmission by radiative coaxial cable in the UHF-VHF range, and have obtained good results.

3. Future programme: No research programme is planned in the immediate future.

6.3 Italy

1. Tests are being carried out on the motorway with loops on the 108 KHz frequency, in tunnels and on a viaduct. In tunnels, the results were very good. On the viaduct, tests showed that the loop would have to be installed at a certain height above the ground (about 1 m).

2. Tests have also been carried out in the 450 KHz range, and in the 168 MHz with a transmitter equipped with a Yagi aerial.

3. Future programme : It is planned to equip a section of the motorway with an experimental communication system operating at low frequency with single wire aerials.

6.4 Belgium

1. Research has been and is being carried out on the transmission of information to drivers in tunnels.

2. Future programme: It is planned to equip a section of the motorway with:
   - message-storage systems
   - radiative coaxial cables
   - transmission in tunnels.

6.5 France

Two types of system have been studied :

1. Transmission loop or single wire aerials in the 100 KHz band (PAAC system).

2. Transmission by point transmitter in the VHF range (80 MHz)
   - in amplitude modulation (BIP-CAR system)
   - in frequency modulation (SILAUE system).

3. However, after discussion with the PTT authorities on the possibility of using these frequencies, work was directed towards the study of mobile systems operating in UHF (450 MHz band). Two systems are being studied and have reached the prototype stages:

   - a system based on the SILAUE system on 450 MHz
   - a PAAC N° 2 hybrid system capable of operating at high frequency (100 KHz) and UHF (450 MHz) which would allow its use with fixed or mobile transmitters.

4. Future programme : This research is completed. No new programme is planned before the end of 1977.

TOPIC 2

Internal visual communication

1. Aims

To define and develop any in-vehicle visual communication equipment which is shown by an evaluation of information and communication requirements to be necessary.

2. Programme

Equipment development has been carried out in Germany and the United Kingdom which has demonstrated the ability to communicate with drivers by means of a visual display inside the vehicle.

A small amount of further research has been carried out in the United Kingdom to determine whether the display can be read in various driving conditions. However it is considered that further research activity on this Topic is inappropriate until the results of the Topic 5 programme are available.

The Topic 5 programme will be looking at the requirements for communication of both traffic and route guidance information. It is considered likely that an in-vehicle visual system would be required if an electronic route guidance system were shown to be necessary and justified.

In this case some further development of the equipment would be required particularly with respect to the most appropriate modulation technique for data transmission and to the visual display design. The ability of drivers to read and comprehend route guidance information whilst driving would need to be investigated.

3. Timetable

Depends on the outcome of work on Topic 5.

4. Cost

About 0.1 MUA: at 1976 prices

5. Participating countries

The active participation of the following countries is planned:

Federal Republic of Germany, France, Italy and United Kingdom (co-ordinating country).

T O P I C 3

Variable signs outside the vehicle (VSOV)

1. Aims

Chapter 16 of the final report (Doc.III/144/73-D - COST/42/73) recommends a "preferred method" for adoption as a European practice for roadside information, including optical signs (variable signs outside the vehicle, VSOV). Section 3 of this chapter provides for an examination of the extent and type of information which should be conveyed to the driver by the system, in this case particularly by means of VSOVs. This project is likewise being dealt with by Study Group 5, whose findings will have implications for Topic 3. To enable both groups to work in parallel, certain assumptions concerning requirements for VSOVs must be made.

The present document sets forth the work and research which now appears necessary; it may be expanded where required.

The cost estimates are to be considered as indicative and not absolutely comparable;in particular, it is not clear whether they are R & D costs or infrastructure costs or both.

It is assumed that the information and signs given in section 5.5 and 5.6 of COST/19/74 will be displayed by means of VSOVs. Variable route signs are also to be included in the discussions.

Initially, it is not the technical design (construction) of the display equipment but the sign itself (symbols) and the general requirements for VSOVs which should be standardized. This will prevent any one technological development being regarded as final and new developments being ruled out. Trials and research will show the level at which requirements should be set, and whether preferred forms of construction are to be recommended for particular applications. For example, mandatory and prohibitory signs carrying legal penalties must comply with the Vienna Convention.

2. Programme

To complete the tasks mentioned in Section 1, the following work is required:

2.1 Symbols to be displayed :

data on how the information and requirements of the traffic regulations contained in COST/19/74 are to be displayed (words, symbols, signs) must be collated.

2.2 Survey of variable message signs seen to be desirable including variable route signs

2.3 Study of the psychology of perception and physico-technological checks

2.3.1 Study of the psychology of perception:

(a) verification of recognizability, legibility and comprehensibility;

(b) investigation of the value of giving additional information.

2.3.2 Physico-technical tests:

study of the technical characteristics and operational safety of VSOVs under various conditions, e.g.:

- reliability
- ease of maintenance
- power consumption
- behaviour in the event of vehicle collisions
- covering of symbols by frost or snow
- length of changeover times
- feedback signals in the event of partial or total breakdowns
- acknowledgement signals for completed changeover operations
- situation of signs in power failures (emergency power supply or mechanical roll-back to neutral position)
- reliability in extreme conditions
- viewing distance
  (a) recognizability as a traffic sign
  (b) legibility distance

- visibility from various viewing angles
- effectiveness in all light conditions (day and night)
- capacity for accommodating characters

2.4 Formulation of general requirements for VSOVs:

2.4.1 Requirements regarding recognizability, legibility and comprehensibility

2.4.2 Requirements regarding changeover times and reliability in operation

2.5 Effectiveness of the appropriate VSOV on individual road users

2.6 Effects of VSOVs on traffic flow

2.7 Proposal for suitable intervals between VSOVs ; the optimum number of VSOVs per cross section

2.8 Recommendations on specifications for European standards in respect of VSOV performance.

3. Timetable

Serial N°	Category	1976	1977	1978
1	2.1	→		
3	2.1	→		
2	2.1 / 2.6	→	→	
4	2.2	→		
5	2.3	→		
6 ±	2.3	→	→	→
10	2.31 (a)	→		
11/12	2.31 (b)		→ - - -	
13 ±	2.32	→	- - - - -	- - - - -
15				
16-18	2.5 / 2.6	→ - - - -		
19	2.6	→ - - - - -	?	
	2.7	?		
	2.8	→	Stage 1	
				Stage 2
		→	→	→
20	2.32	→	→	

4. Cost

Approximately 1.375 MUA at 1976 prices.

5. Participating countries

The active participation of the following countries is planned : Belgium, France, Netherlands, United Kingdom and Federal Republic of Germany (coordinating country).

6. National Research Programmes

Serial N°	Problem N°	T o p i c	Research Establishment	Commissioned by	Costs	Date
1	2.1	Investigation of variable route-sign equipment in connection with a new route-sign system for motorways	BAST	BMV (G)		1972 - probably 1976
2	2.1 and 2.2	Investigation of supplementary variable routing	BAST	BMV		1975-1977
3	2.1	Development of new informatory symbols (for message concepts given in COST/19/74)	TRRL	UK	approximately £ 2.000 UA 3.500	1976
4	2.2	Development of additional matrix panel giving supplementary information	TRRL	UK	£ 8.000 UA 13.500	1975-1976
5	2.3	Comparative tests of visibility of VSOVs operating on matrix and roller blind principles. Maximum viewing distances will be compared in various weather and visibility conditions	TRRL	UK	£ 11.000 UA 18.500	1974-1976 (in principle, completed).

Serial N°	Problem N°	T o p i c	Research Establishment	Commissioned by	Costs	Date
6	2.3.1	Psychological evaluation of VSOV system	Prof. Erke	BVM (G)		1977-78
7	2.3.1 (a)	- Tests on understanding of new informatory symbols	TRRL	UK	£ 3.000 UA 5.000	1976
8		- Tests on understanding of complete three part (instruction, information, distance) sign			£ 3.000 UA 5.000	
9	2.3.1 (a)	- Investigation of effect of enclosing shape			£ 3.000 UA 5.000	
10		- Measurement of perception (comprehension) time of three part sign (with distraction)			£ 3.000 UA 5.000	
11	2.3.1 (b) 2.5 and 2.6	Full-scale road demonstration on a 24 km stretch of a three-lane motorway in the UK in order to gain information concerning the type of fog, blocked traffic lanes and recommended maximum speeds	TRRL	UK		from 1976
12	2.3.1(b)	Public road trial	TRRL	UK		
13	2.3.2	Practical testing of variable road signs (for details see Doc. III/601/74) and IRT Report N° 2 and SETRA Report of 29 March 1976	IRT	SETRA (F)	FF. 70.000 UA 13.500	since 197[illegible] permanent study

Serial N°	Problem N°	T o p i c	Research Establishment	Commissioned by	Costs	Date
14	2.3.2	Investigation of the effect of dirt accumulation on legibility of matrix sign Comparison of legibility of matrix and roller-blind signs in fog	TRRL	UK	approx. £ 3.000 UA 5.000 £ 3.000 UA 5.000	1976
15	2.3.2	Survey of types of tests to be carried out for changeable signs	Rijkswaterstaat	NL		in progress
16	2.5 / 2.6	Drivers' reaction to matrix signs showing 90/70/50/30 as warnings for traffic congestion	Rijkswaterstaat	NL		Monthly measurements
17	2.5 / 2.6	Includes study of drivers' behaviour when confronted with VSOVs for various speeds (for details see Doc.III/774/74)	IRT	F	FF. 9 million UA 365.000	
18	2.5 / 2.6	Investigation of the effect on traffic and the potential uses of congestion warning systems	BAST	BVM	DM.2.5million UA 893.000	1973-76

Serial N°	Problem N°	T o p i c	Research Establishment	Commissioned by	Costs	Date
19	2.6	Investigation of the use of permanent light signals to demarcate motorway lanes	BAST	BVM		1973-?
20	2.3.2	Vibration, endurance and climatic tests; legibility measurements	IRT	F	FF. 200.000 UA 38.500	1976-77

T O P I C 4

Area broadcast of traffic information

1. Aims

The aim in this phase of the work is to investigate which basic requirements should be met by a system for area broadcasting of traffic information, if possible on a European scale.

Once these basic requirements are known, specifications will be given for the design and implementation of such a system.

2. Programme

- inventory on structure and organization for traffic information in several European countries.
  (including technical solutions/suggestions for transmission)
- standardisation of traffic announcements regarding
  - content of announcements
  - circumstances and criteria on which announcements are transmitted or rejected
- survey to examine drivers' response to traffic information
- assessment/ listing specifications for technical design and for implementation / running a system for area broadcasting of traffic information.

The following list of items should be contained in the requirements for an area broadcasting system for traffic information:

1) The number of messages the system should be capable of handling; the number of messages is influenced by:
   - the necessary repetition of certain messages and by clearance messages
   - the criteria on which messages are rejected or transmitted i.e. by the relevance of traffic and environmental conditions
   - what the peak rate will be

2) The average duration of a message
   - this question may be affected by the multi-language problem.

3) The size of an area
   - this is determined by message contents and average trip-length

4) Whether the system should handle more than one language
   - due to geographic location of the country in connection with international traffic
   - in case of multi-lingual nations

5) Priority of messages (i.e. acceptable time delay before transmission)
   - depending on relevance of traffic and environmental conditions
   - need to give strategic and/or tactical messages

6) Long range strategic information between countries

7) How area-information should overlap

8) What form of control/distribution facilities of messages should be available

9) Maximum amount of information a driver can accept, and other ergonomic aspects, including the possible standardisation of the structure of the messages in order more especially to facilitate translation

10) Reliability and credibility
consistency with road based systems - external visual
- in car aural
- in car visual

The system should be set up in order to reach as many people concerned as possible, both at home and on the road.

To what extent do we need to help the listener to get the information and what does it mean from the traffic engineering point of view if only some of the drivers (e.g. native speakers only) can get the information?

3. Timetable

3.1 Establishment of state of the art (sections 2.1 to 2.4 of the programme).
Estimated duration : mid-1976

3.2 Supplementary work and final details (essentially item 2.5 of the programme).
Beginning: mid-1976 End: mid-1977

3.3 Establishment of report and conclusions (according to objectives)
Second half of 1977.

4. Cost

237,000 UA at 1976 prices.

5. Participating countries The active participation of the following countries is planned:
Federal Republic of Germany, United Kingdom, Switzerland, France, Sweden & Netherlands (coordinating country).

T O P I C 5

Survey of information needs

1. Aims

To determine the possible advantages for road use of the various driver communication and route guidance systems now under study. To evaluate the needs felt by road users and authorities in this field.

2. Programme

2.1 To evaluate the nature and frequency of incidents which cause hazard or delay on roads which could be equipped with a communication or route guidance system.

2.2 To evaluate the number, duration and scale of incidents in which the hazard or delay might usefully be reduced by a communication or route guidance system. (This point must be studied in conjunction with Topic 6).

2.3 To determine the type of information and the related operational means needed to cope with such incidents and which could be provided by communication and route guidance systems.

2.4 To study the type of information which the public at present believes is desirable from :

- the various communication systems studied;
- a route guidance system.

2.5 To study the type of information which the responsible road traffic, safety and maintenance authorities consider it useful to communicate to drivers and the means of communication they regard as best suited to their needs.

3. Timetable

Study	1976	1977	National contributions
2,1			F, UK,
2,2			F, UK, F.R.G.
2,3			F, UK,
2,4			F, UK,
2,5			F, UK,

4. Cost : Approximately estimated cost: 0.2 MUA at 1976 prices.

5. Participating countries: The active participation of the following countries is planned :
Federal Republic of Germany, Italy, Netherlands, United Kingdom and France (coordinating country).

6. National research programmes

6.1 United Kingdom

6.1.1 A survey was carried out among 500 motorway drivers in Berkshire to determine the information they required about disturbances to traffic flow, and the way in which they understood messages on illuminated matrix panels.

6.1.2 A survey has also been conducted on roads and motorways in an area west of London to determine the number of traffic incidents which have caused disturbances in this area over a certain period of time.

6.1.3 A preliminary study, covering 50 subjects, of route guidance requirements has been carried out between the TRRL and Chertsey.

The study showed that road users did not generally choose the optimum traffic routes.

6.1.4 Future programme: The following studies are planned for the period 1976-1977 :

6.1.4.1 A more general survey among drivers to assess their information requirements on motorways and roads

6.1.4.2 An enquiry with the police authorities to examine the communication they require with drivers on roads other than motorways.

6.1.4.3 Assembly of data on frequency, duration and scale of incidents.

6.1.4.4 At the end of this study, drafting of specifications on drivers' information requirements.

6.1.4.5 A programme on drivers' route planning is also to be launched with the following objectives:

- to determine the extent to which the routes chosen by drivers deviate from the optimum route
- to study the nature of these deviations
- to define politically acceptable and economically worthwhile methods whereby these deviations could be reduced.

In addition to the Chertsey experiment just described, the programme also includes:

a) an experiment concerning the choice of routes by regular road users
b) national-scale assessment of economic losses due to the fact that route selection is not optimum
c) study of methods whereby these economic losses could be reduced
d) drafting of a report on the advantages of a route guidance system.

6.2 Switzerland :

Work has just been completed on the assessment of the number and effects of traffic flow disturbances on a network of heavy traffic roads and motorways.

6.3 France :

6.3.1 A study was carried out in 1974-1975 on the number and nature of traffic incidents affecting a network of main roads (routes nationales) and motorways in south-east France.

6.3.2 Future programme : the following work is planned for 1976-1977

1. A survey of drivers' needs, comprising:
   - a preliminary analysis of requests put by road users to the various information authorities, and a preliminary survey of a particular sample of such users.
   - a more detailed survey on a broader scale among road users.

2. A study of the requirements of highway management authorities based on surveys among the following :
   - gendarmerie detachments
   - motorway operating headquarters.

3. A study of the possibility of carrying out comparative laboratory tests of drivers' acceptance of messages in visual and aural form.

T O P I C 6

Incident detection

1. Aims

The objectives are to evaluate the need for manual incident detection (MID) as well as automatic incident detection (AID) systems and to develop procedures and guidelines regarding selection, design, installation and operation of such systems for different applications on major roads.

European cooperation in this field is worthwhile in order to avoid duplication of efforts although strict standardization of system components is not envisaged.

2. Programme

The work can be divided into the following main parts :

2.1 Collection and exchange of information

1 - continuous updating of the current state of the art
2 - preparation and distribution of fact sheets on important news
3 - exchange of information with research centres outside Europe (mainly U.S.A. and Japan).

2.2 **Studies of the demand for and benefit of incident detection systems**

1 - definition of what should be considered as an incident

2 - studies of frequency and duration of different types of incidents and related consequences on traffic flow and safety (to be carried out in relationship with Topic 5)

3 - Studies of management and clearance of incidents and related benefits in travel and time saving.

2.3 **Studies of MID-systems**

1 - studies of design and management of different manual systems such as highway patrols, call boxes, citizens band radio etc.

2 - studies of the frequency of usage, false alarm rate and response time

3 - analysis of the benefits and cost of MID-systems for different applications

2.4 **Studies of AID-systems**

1 - development of algorithms for AID and theoretical analysis of relationships between response time, false alarm probability, probability of detection of incidents and type spacing of detectors

2 - field experiments with AID. Verification of the theory

3 - analysis of the benefit and cost of AID-systems for different applications

2.5 Procedures, guidelines and specifications

1 - minimum requirements for incident detection (ID) systems

2 - procedures and guidelines for selection of ID-systems

3 - methods for calculation of cost-effectiveness and estimation of overall benefit of ID

4 - specifications for ID-systems to be used in the demonstration project (subject to special approval)

2.6 Documentation

- preparation and publication of a report and recommendations

3. Timetable

This timetable also shows where current research corresponds to the programme as planned.

Item	Time schedule 1976	1977	1978	National contributions according to programme*
a. Collection and exchange of information	→	→	→	Point 2.1: 1) F.1-2; 2) D.2, NL.2; 3) S.1,
b. Studies of demand and benefit of ID-systems	→	→	→	Point 2.2: 1) S.2, 2) F.2, S.2, 3) D.1,
c. Studies of MID-systems	→	→		Point 2.3: 1) F.3, D.1, S.2, 2) D.1, S.2, 3)
d. Studies of AID-systems	→	→	→	Point 2.4: 1) F.1-2, D.2, NL.2, S.1, UK. 2) B.2, F.1-2, D.2, NL.2, 3) NL.2, S.1, UK,
e. Procedures, guidelines and specifications			→	Point 2.5: 1) F.3, D.2, 2) F.3, D.2, 3) 4)
f. Report				

(*) The indications in this column (F.1-2, D.2...) refer to the national research projects considered in point 6.

4. Cost

The total cost of research in hand is estimated at 0.3 MUA
Further research must still be launched over the next three years if aims are to be achieved and its cost is also estimated at 0.3 MUA; current inadequacies mainly concern items 2.2.3, 2.3.1-3, 2.4.3 and 2.5.1-4 of the programme.

Total cost at 1976 prices: 0.6 MUA

5. Participating countries **The active participation of the following countries is planned:**

Federal Republic of Germany, Belgium, France, Italy, Netherlands, United Kingdom, Switzerland and Sweden (coordinating country).

6. National research programmes

BELGIUM

Project B.1

Organisation : Administration de l'Electricité et de l'Electromécanique R.21

Description : Automatic traffic control of the Reyers complex at Schaerbeek including an AID-system with 276 inductive loops and 42 CCTV-cameras. The system uses threshold values for speed and occupancy.

Time : Active.

Project B.2 (point 2.4.2 of the programme)

Organisation : Ministry of Public Works

Description : Automatic system for traffic flow counts on the complete motorway network in Belgium.

Time : 600 loops installed and attached to control computer 1976.

FRANCE

Project F.1 (Points 2.1.1-2 and 2.4.1-2 of the programme)

Organisation : Ministry of Equipment. Region of Paris

Description : Field experiments with different AID strategies on the motorways A6-B6 near Paris, total road length 30 km. Single inductive loop detectors in every lane, loop spacing 1-3 km.

Time : Operational at the end of 1976.
A separate cost estimate for the AID part of the project is not available.

Project F.2 (Points 2.1, 2.2.2 and 2.4.1-2 of the programme)

Organisation : Ministry of Equipment

Description : Field experiments with different AID strategies on the motorway A 13 near Paris. Single inductive loop detectors in every lane

a) 9 km stretch: every 500 m

b) 15 km stretch: every 3-4 km

CCTV is used to confirm and define incidents

Time : Operational at the end of 1975. The AID-system cost is estimated to 3 MFF, the CCTV cost to 5 MFF.

Project F.3 (Points 2.3 and 2.5.1-2 of the programme)

Organisation : City of Paris

Description : To obtain criteria of feasible density of CCTV cover in an ID-system for a 6.5 km stretch of Boulevard Périphérique in Paris.

Time : Not operational before 1977.

FEDERAL REPUBLIC OF GERMANY

Project D.1 (points 2.2.3 and 2.3.1-2 of the programme)

Organisation : Bundesverkehrsministerium
Dr. Ing. Steierwald/Dr. Ing. Heusch/ Dipl.-Ing. Boesefeldt

Description : Study of corridor control with variable message signs for alternative routes.
Rhein-Main motorway complex.
MID and incident prevention programme.

Time : Active

Project D.2 (Points 2.1, 2.4.1-2 and 2.5.1-2 of the programme)

Organisation : Bundesanstalt für das Strassenwesen.

Description : Field experiments with different AID-methods on an 8 km stretch of motorway between Stuttgart and Munich in Aichelberg. Double 3x3 m inductive loop detectors in each lane, spacing 500 m.

Field installations including gantries with optical fibre matrix signs.

Time : Hardware installations completed. Implementation of software started.

NETHERLANDS

Project NL.1 (Point 2.4.2 of the programme)

Organisation : Rijkswaterstaat in the Hague

Description : Motorway surveillance and control system on motorway RW 13 (25 km). Double inductive loop detectors in each lane every 500 m for AID-purposes.

Time : Started. Fully operational in 1979.

Project NL.2 (Points 2.1 and 2.4.1-2 of the programme)

Organisation : Rijkswaterstaat in the Hague

Description : Development of AID theories and off-line tests both on simulated traffic and on traffic data.

Time : 1976-1980, active.

SWEDEN

Project S.1 (points 2.1 and 2.4.1-2 of the programme)

Organisation : Telephone C°. L M Ericsson. Swedish Board of Technical Development.

Description : Field tests using the long-loop detectors for AID on a 4 km stretch of the motorway E 4 in Stockholm. Detector length 150 m, spacing 500 m. Off-line tests of strategies.

Time : Completed by the end of 1977

Project S.2 (Points 2.2.1-2 and 2.3.1-2 of the programme)

Organisation : Swedish Transport Research Commission

Description : Field studies of the frequency of incidents. Tests of reliability of CB-radio for incident reporting

Time : Completed in 1978

UNITED KINGDOM

Project U.K. (Point 2.4.1-2 of the programme)

Organisation : T R R L

Description : Field data collection of traffic behaviour at incidents on a 1.2 km stretch of the motorway M 4 near London. Single inductive loop detectors in each lane, spacing 400 m. Off-line tests of AID-strategies.

Time : active

T O P I C 7

Coordination on intelligibility of messages

1. Aims

- The messages given in different languages to be considered in Topics 1 and 2 should be short, clear, unambiguous and have the same meaning.

- The terminology for road signs considered in Topic 3 should also be coordinated in those cases where no symbols are available.

2. Programme

Subject

1. To study message structures, including the sequencing of the various parts of the message in the interests of clarity.

2. To adapt messages to each language, taking into account the need:
   - to select words which are most clearly distinguishable above the noise inside the vehicle;
   - to compile messages which are as brief as possible;
   - to avoid the use of words which have different meanings in the various languages (e.g., "control").

3. To participate in the coordination of communications over the various systems adopted for a possible demonstration project.

Data:

The data to be considered for transmission will emerge from the programme proposed for Topics 1, 2, 3 and 5.

3. Cost

The total cost of the programme is estimated at 15 000 UA

4. Timetable

The work will be accomplished intermittently as and when the data become available.

5. Participating countries The active participation of the following countries is planned :

Federal Republic of Germany, Italy and Belgium (coordinating country).

The work will be carried out with the collaboration of the terminology services of the European Community.

T O P I C 8

Development of automatic detection of bad weather conditions

1. Aims

The aim of this research is to develop to prototype stage a system for detecting and predicting weather and driving conditions and forecasting changes. The system will detect, predict, and give warning of hazardous changes in each of the following conditions : visibility, wind speed and gustiness, skid risk due to changes in weather and flood risk. Furthermore the aim is to examine the problem of short term weather forecasting and its repercussions on road maintenance, traffic strategy and the identification of bad-weather "blackspots".

2. Programme

2.1 Definition of information requirements in light of operational research

2.2 Inventory and assessment of current studies, methods and equipment.

2.3 Study of frequency of occurrence and duration of various types of weather and road conditions.

2.4 Study of relationship between weather and road conditions to obtain basic statistical material for forecasting purposes.

2.5 Development of sensors from theoretical stage to construction stage.

2.6 Development of detection and warning systems based on measurements, statistics and other meteorological data.

2.7 Development of data processing outputs and transmission modes suitable for the entire system (Mark 1).

2.8 Manufacture and testing of a prototype, analysis and specifications.

3. Timetable.

Activities	1974	1975	1976	1977
1. Definition of information requirements				
2. Inventory				
3. Study of the frequency and duration of different weather conditions				
4. Study of internal relationship between weather and road conditions				
5. Development of sensors				
6. Development of models for detecting and warning system				
7. Processing and data transmission				
8. Manufacture and testing of prototype, analysis, specifications				

4. Cost: 1.14 MUA at 1976 prices

5. Participating countries

The active participation of the following countries is planned : Belgium, Federal Republic of Germany, France, Italy, Netherlands, Sweden, Switzerland, United Kingdom, Yugoslavia and Finland (coordinating country).

6. National research programmes

BELGIUM : Ministere des Travaux Publics is studying detecting methods for ice and fog.

FINLAND : Meteorological Institute is studying internal relations between weather and road conditions, especially slipperiness and is developing models for use of various meteorological data for detecting and warning purposes. Timescale 1975-1977.

A study is being made of the development of sensors, data processing and transmission equipment for detecting and warning prototype systems. Timescale 1975-1977.

National Board of Public Roads and Waterways together with the State Technical Research Centre are measuring slipperiness of road surface on test sections and studying its relationship to maintenance. Furthermore the "National Board of Public Roads and Waterways" is studying the relations ip between weather and accidents, and is considering installing an automatic weather station. Timescale 1975-1977.

FRANCE : SETRA is studying detectors for ice and fog. Timescale 1975-1976.

GERMANY : Bundesanstalt für Strassenwesen has a trial of a fog-warning system under way. Timescale 1971-1976.

Institut für Verkehrswesen, Universität Karlsruhe is studying the influence of different fog density on traffic flow. Timescale 1974-1975.

NETHERLANDS: State Road Laboratory operates an ice-warning system.

SWEDEN : National Swedish Road and Traffic Research Institute :

- Slipperiness on heat-insulated roads
- Development of mobile instrument systems for measuring air temperature
- Test sections for studying icing on the road surface.

SWITZERLAND: Operating ice-warning system on motorway N 2.

UNITED KINGDOM : T R R L is studying (1975-1977) sensors and a prediction model for visibility.

T O P I C 9

Central equipment, control strategies, data transmission, method of evaluation

1. Aims

Group 9 will treat the problems of

- System elements and system software :
  - Control strategy
  - Data transmission
  - Control centre equipment
- Procedures and methods of assessment for the choice of communication systems, in particular clarification of the need for a public demonstration, and the presentation of a report on this issue after 2 years.

2. Programme

System elements and system software :

2.1
- Control strategy
  - Inventory of control strategies of existing or planned motorway communication systems (operational criteria, control logic, message content, software) and analysis of the influence of enhanced communication systems
  - Elaboration of common directions for the development of the software
- Data transmission
  - Synopsis of the data transmission requirements of the individual system components
  - Inventory of actual data transmission systems and comparison with the aforementioned requirements

- Control centre equipment
  - Inventory of existing control centre equipment (central processor, control units, functions)
  - Derivation of minimum requirements

2.2 Procedures and methods of assessment for the choice of systems:

- Methods of assessment:

Synopsis and evaluation of the different procedures for the choice of a standard communication system such as,

- Collection of descriptive data,
- Single tests in laboratories,
- Comparative tests in laboratories,
- Independent tests during practical use of the systems,
- Simulation

- Procedures for the choice of the system :
  - Synopsis of the detailed technical specifications defined by the COST 30 Technical Sub-groups
  - Assembly and analysis of existing studies on :
    - driver confort
    - drivers' subjective safety
  - Derivation of evaluation criteria, enabling the competitive prototype systems to be compared
  - Specification of methods of assessment for the various evaluation criteria covering the following aspects :
    - Traffic safety
    - Drivers' subjective safety and comfort :

      these relatively under-researched problems probably constitute important factors in the assessment of communication media
    - Reduction of delays and stops
    - Cost-benefit analysis

3. Timetable

The results should be available in 2 years time.

4. Cost

The cost per participating country is estimated at 8 000 - 10,000 UA .
Total at 1976 prices: 70,000 UA .

5. Participating countries

The active participation of the following countries is **planned** :
Belgium, Federal Republic of Germany, Finland, France, Italy, Netherlands, United Kingdom, Yugoslavia and Switzerland (coordinating country).
