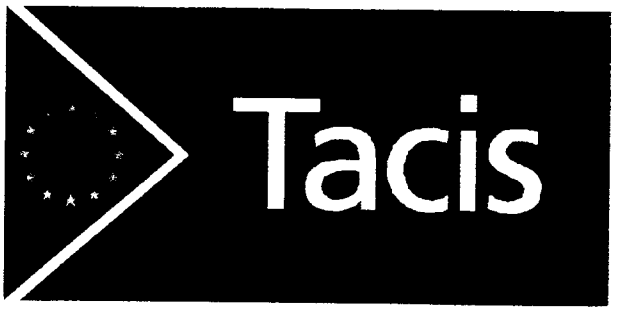

TRACECA Programme:
Regional Traffic Database and Forecasting Model

'Project Completion Report'

August 1998

European Union

Tacis Programme

TRACECA: Regional Traffic Database and Forecasting Model

(Project No. WS.93.05/05.01/B008)

Project Completion Report

August 1998

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TACIS REPORT COVER PAGE

Project Title	: TRACECA: Regional Traffic Database and Forecasting Model
Project Number	: WW 93.05/05.01/B008
Country	: All 8 TRACECA States
Local Operator	: Tacis Co-ordination Units
EC Consultant	: WS Atkins International Limited Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5BW, UK Tel: +44 1372 726140 Fax: 44 1372 740055
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Date of Report : August 1998

Reporting Period : September 1997 to May 1998

Author of Report : WS Atkins International Limited

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EC Delegation	_____ [name]	_____ [signature]	_____ [date]
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1. INTRODUCTION AND PROJECT SYNOPSIS

1.1 This document represents the Project Completion Report for the Tacis project TRACECA Traffic Forecasting Model, Project No WW93.05/05.01/B008. The 'Project Synopsis' is shown in Table 1.1

1.2 This report, together with Annexes A to C, represents the administrative reporting on completion of the project and provides a review of project implementation and progress in the final reporting period.

1.3 A separate Final 'Technical' Report describes the database and traffic forecasting tools developed in the course of the study and summarises the results of the case study analyses undertaken using these tools. Details of these case study tests are provided in supporting annexes. Recommendations for the future maintenance and operation of the database and model are also provided in this Final 'Technical' Report.

Table 1.1 - Project Synopsis

Project Title	:	TRACECA Regional Traffic Database and Forecasting Model
Project Number	:	WW 93.05/05.01/B008
Country	:	All 8 TRACECA States

Wider Objectives: to assist in the prioritising of transport investment options in the region through the introduction of a quantitative planning tool which can simulate the impacts of investment.

Specific Project Objectives:

- introduction and establishment of computer-based planning tools in the eight TRACECA states including:
  - a common regional database of transport and trade flows and transport infrastructure and transport costs;
  - a multi-modal model for analysing scenarios and developing forecasts;
- application of the tools to:
  - create comprehensive multi-modal synoptics of existing and forecast future flows;
  - highlight bottlenecks of all types;
  - identify preferred locations for multi-modal transfer centres;
  - identify and catalogue specific road/rail/maritime and multimodal projects for detailed feasibility studies;
- transfer of know-how in transport database design and modelling.

Outputs/Activities:

- an Inception Mission and Inception Report (month 3);
- Phase 1A involving data acquisition and storage followed by Progress Report 1 (month 9);
- Phase 1B consisting of the development of scenarios and database, followed by Progress Report II (month 13);
- Phase 2 including synoptic forecasts and development of investment options, followed by Progress Report III (month 15);
- Phase 3 which is the handover of the computer equipment and software and support missions, followed by a draft Final Report (month 18) and Final Report (month 21).

Inputs:

- technical assistance;
- computers and other office equipment;
- database, forecasting and office-oriented computer software.

Project Starting Date	:	Mid-January 1996
Project Duration	:	21 Months

2. PROJECT PROGRESS SINCE START OF PROJECT

2.1 The project commenced in January 1996 with a contract end date (to coincide with the production of the draft Final Report) of end June 1997. A three month extension to the project duration was agreed in April 1997 with a revised contract end date of 20 September 1997.

2.2 As summarised in the project synopsis the work was structured as three phases following an Inception phase with the first phase sub-divided into two sub-phases. The programme of work as planned at the Inception stage is shown in Annex A. In practice, a number of key tasks extended into subsequent phases reflecting both the delays experienced in collating and processing data sets and the interactions between tasks and phases concerned with the development and training, the use of the database and modelling tasks. Figure 2.1 shows the programme of work as actually implemented.

2.3 Phase 1A necessarily extended through to the final month of the project in order to include 1996 as well as 1995 trade data in the database. In accordance with the long-term objectives and sustainability of the project, data collection has been treated as a continuous exercise.

2.4 Phase 1B was also extended reflecting the continuous nature of data collection and its input to the database and model development. Calibration and validation of the model in particular, required careful treatment of apparent inconsistencies in data sets.

2.5 Phase 2 work on scenario definitions, development of economic forecasts and case study definitions was undertaken over months 13 to 18 reflecting the extended duration of the earlier Phase 1 work. Hence, a 'slippage' of approximately three months was identified at this stage and a contract extension agreed with Tacis. The remainder of the Phase 2 work on testing the forecasting model runs as inputs to case study tests was undertaken in parallel with, and as an integral part of, the Phase 3 work.

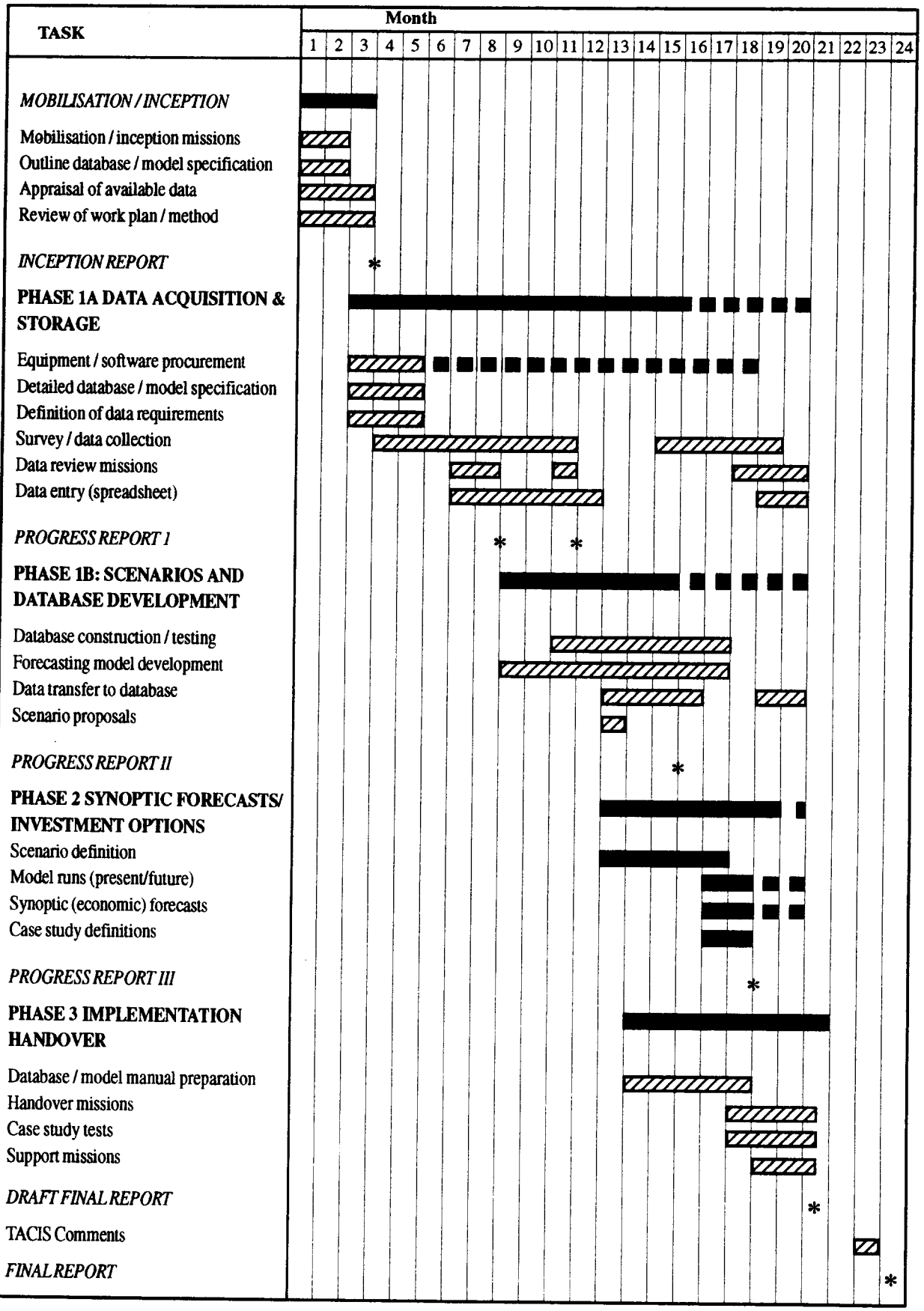

FIGURE 2.1: Project Programme as Implemented

2.6 The Phase 3 work was also implemented over an extended period with the database and model manuals preparation starting as originally scheduled but with the handover missions and case study tests benefiting from the project programme extension period.

2.7 A comparison between the planned and actual programmes as presented in Figures A.1 and 2.1 respectively shows that the duration of many of the tasks was extended. This reflects the fact that training of the local partners involved not only the formal training during Phase 3 but an interactive process of joint working and technology transfer during tasks in earlier phases. Informal training as part of the data collection, model development and scenario definition work was undertaken with various of the local partners during these earlier phases.

3. PROJECT PROGRESS IN FINAL REPORTING PERIOD

3.1 Since submission of the Progress Report II (June 1997) the main focus of the work has been on the application of the model for case study testing and the handover/training in the use of the database and model. Preparation of this draft final report has also been undertaken in this period. Annex B contains the Project Performance Tables for this period.

3.2 Handover and support missions were integrated with training in the application of the model for case study analyses and use of the database for storing updated 1996 trade data. The initial handover missions started in month 18 and continued through to month 21.

3.3 Seminars and workshops were held as follows:

June 16-19	Ashgabad for all Central Asian partners;
June 23-27	Tblisi for all Caucasian partners;
July 16-18	Tashkent for Uzbekistan partner;
July 21-25	Bishkek for all Central Asian partners;
July 28	Baku for Azerbaijan partner;
July 29 - August 1	Tblisi for all Caucasian partners;
September 2 - 5	Almaty for all Central Asian partners;
September 8 - 9	Baku for Azerbiajan partner;
September 17 - 20	Yerevan for Armenian and Georgian partners reporting.

3.4 This Final Report follows a the Draft Final Report and incorporates changes in the light of comments from Tacis (Co-ordination Team and Monitoring and Evaluation Consultants) and recipients. These changes have been interpreted as modifications proposed by the Commission.

4. OVERALL REPORT ON THE PROJECT

Method of Working

4.1 The project team represented a combination of EU experts and local experts employed through local partner organisations nominated by a recipient organisation in each of the eight TRACECA countries.

4.2 Local partner inputs focused initially on data collection and processing under the guidance of a EU Expert Field Manager. As the project progressed local partners became more involved in preparing inputs to the model development including network coding and economic forecasting. Initial calibration of the model and construction of the database was undertaken primarily by EU experts prior to training local partner organisations in the application of these tools in the TRACECA Region.

4.3 A key objective has been to provide the local partners with both the database and modelling tools and technical know-how to sustain these beyond the end of the project. The following paragraphs describe the local partner involvement in the project. Chapter 6 in the Final 'Technical' Report presents our recommendation for the on-going operation and maintenance of the database and model.

4.4 Throughout the project a distinction has been maintained in each country between the recipient organisation and the local partner.

4.5 The recipient organisation (or 'local operator') in each country is the official beneficiary of the TRACECA project and comprises a Government Ministry or Cabinet. This beneficiary is effectively the owner of the database and modelling software and hardware provided in each of the eight TRACECA countries as a project deliverable. The recipient organisation in each country is as follows:

Armenia	-	Ministry of Transport
Azerbaijan	-	Ministry of Economy
Georgia	-	Ministry of Transport

Kazakhstan	-	Ministry of Transport
Kygyzstan	-	Ministry of Transport
Tajikistan	-	Ministry of Economy
Turkmenistan	-	Cabinet of Ministers
Uzbekistan	-	Cabinet of Ministers

4.6 As has been the case during the project the recipient organisation is responsible for appointing an appropriate technical organisation to undertake the database and model operations as required both by the recipient organisations and external (third party) users of data and forecasts (including international funding agencies).

4.7 As has been indicated in earlier progress reports, the nomination of local technical partner organisations has varied from country to country. At the outset, during visits in January and February 1996 we sought to establish agreement with local partners nominated by the recipient Governments. Meetings with all recipient organisations were held in the early stages of the project in order to secure official appointment of a local partner and/or to form a new multi-discipline agency. However, in practice, certain recipients preferred not to make a firm commitment to technical partners but instead to maintain a more flexible approach by participating in the technical work themselves and/or by involving technical organisations in specific aspects of the work only. In addition, the assignment of local partners to the project in one or two countries has been changed at a Ministerial level. This situation is outlined in the Table below.

Country	Partner(s)	Agreed By	Date
Kazakstan	AO-NIIAT and Kazgiprojeldortrans	Vice Minister Transport	January 1996-February 1996
Kyrgystan	Kyrghzdortransproekt	Original consultant proposal and accepted by First Deputy Minister Transport Mr JJ Satybaldiev	February 1996
Tadjikistan	Tadjikgipro-transstroy Institute	Agreed with Ministry of Economy at consultants proposal stage	
Turkmenistan	Turkmenistan State Institute of Transport	Secretariat of Cabinet of Ministers	January 1996
	Institute of Economy (Transport Division)	Secretariat of Cabinet of Ministers	October 1996

Country	Partner(s)	Agreed By	Date
Uzbekistan	1) Gozkomprognozstat	Tacis C U	February 1996
	2) Uzavtotranstechnica	DG Uzavtotrans	August 1996
	3) Uzavtotransistema	DG Uzavtotrans	December 1996
Azerbaijan	Railways Computing Centre	Mr I Sadikov Chief Transport Division, Ministry of Economy	October 1996
Georgia	1) Marketing Research Centre	Co-ordination Committee for Transport	January 1996
	2) Centre for Problems of the Euro-Asian Transport Corridor	Ministry of Transport	October 1996
Armenia	Department of Technical Development, Ministry of Transport	Mr Shaknazaryan First Deputy Minister of Transport	February 1996

4.8 In practice it was not possible within the timescale for the project to secure unequivocal official appointments and/or creation of a local partner with the full range of technical capabilities. Similarly, as contractors it was clearly not feasible for us to insist on local partners being given legal status and instead we adopted a more pragmatic approach which necessitated us working with the nominated local partner whilst assisting them in identifying local experts from third party organisations (such as universities to assist in specific technical areas and collation of specific data sets).

4.9 Consequently, the selection of local partners was finalised in the course of the TRACECA project through on going liaison with recipient governments and, in some cases, through joint actions with the TRACECA Co-ordinating Team. The position in each country is summarised in Annex C.

4.10 Equal opportunities were afforded to all partners to participate in each phase of the study. Whilst all necessarily participated in the data collection tasks, variations in the involvement of local partners in the modelling development reflected the level of priority recipient governments attached to the project. All partners participated in the handover and case study work.

Reporting

4.11 In the course of the study four progress reports have been produced at the end of each of the key stages of the study:

- Inception Report (April 1996);
- Progress Report I (September 1996) (Revised December 1996);
- Progress Report II (March 1997);
- Progress Report III (June 1997);
- The Draft Final Report (September 1997) was submitted at the end of the contract date.

4.12 In addition three key technical reports have been produced:

- Database Manual (May 1997);
- Traffic Model Development Report (August 1997) (earlier draft issued as a seminar paper in June 1997);
- SATURN Manual (Russian Translation) (May 1997).

Project Completion and Output Performance Tables

4.13 Figures 4.1 and 4.2 present a project completion report and output performance summary respectively.

Figure 4.1 - Project Completion Report

Project title : TRACECA: Regional Traffic Database and Forecasting Model	Project nr : WW 93.05/05.01/B008	Country : All 8 TRACECA States	Page :
Reporting period : Up to September 1997	Prepared on : August 1998	EC Consultant : WS Atkins International Limited Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 5BW Tel: +44 1372 726140 Fax: +44 1372 740055	

REPORTING PERIOD	MAIN ACTIVITIES UNDERTAKEN	EC CONSULTANT MAN MONTHS	LOCAL PARTNERS MAN MONTHS	INPUTS UTILISED	
				MATERIALS AND EQUIPMENT (Computer/etc.)	OTHER
1/96 - 4/96 **Mobilisation Inception**	Mobilisation and Inception	5½	2½	Portable computer (x1)	Inception Report (x8)
3/96 - 8/97 **Data Acquisition and Storage (Phase 1A)**	Database and Model Specifications Data Collection Data Entry	2½ 6 3	 21 17	Computer at Almaty (x1) Photocopier (x1) Fax at Almaty (x1) Fax at Yerevan (Armenia) (x1)	Progress Report I (x8)
10/96 - 8/97 **Scenarios and Database Development (Phase 1B)**	Database Construction Model Construction	2½ 4	 13½ 12	Kyrgyz computer (x1) Tadjik computer (x1) Uzbekistan computer (x1)	Progress Report II (x 11)
1/97 - 7/97 **Synoptic Forecasts/Investment Options (Phase 2)**	Scenario Definitions Economic Forecasts Case Study Definitions	1½ 2½ 2½	4 10 5	Turkmenistan computers (x2) Georgia computer (x1)	Progress Report III (x11)
2/97 - 9/97 **Implementation/Handover (Phase 3)**	Database/Model Manual Preparation Case Study Tests Handover and Support Missions	2 3 4	1 3 17	Azerbaijan computer (x1) Armenia computer (x1)	TRACECA Database Manual (x 11) TRACECA Forecasting Model & Manual (x 11) SATURN Manual in Russian (x8)
9/97 Final Report	Draft	1	1		
8/98 Final Report	Final Report	1	-		Draft Final Report and comments
	TOTAL	41	107		

Figure 4.2 - Output Performance Summary

Project title : TRACECA: Regional Traffic Database and Forecasting Model	Project nr : WW 93.05/05.01/B008	Country : All 8 TRACECA States	Page :
Prepared on : September 1997		EC Consultant : WS Atkins International Limited Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 5BW Tel: +44 1372 726140 Fax: +44 1372 740055	

Output results	Deviation original plan (+ or - months for submission of deliverable)	Reason for deviation	Comment on constraints & assumptions
Inception Report	+1 month	• Lack of preparedness amongst local official organisations • Access to available data	• Flexibility required in achieving input from local partners and specialists.
Progress Report I	+3 months (for revised report)	• Data collation and data reliability difficulties	• Specific data sets were required - necessitating approval procedures at ministerial levels and investment of more than one local institute in some cases.
Progress Report II	+2 months	• Model calibration complications	• Determining appropriate tariff levels and model parameters constrained by availability of reliable data sources and transitionary nature of economies.
Progress Report III	+3 months	• Achieving agreement on economic forecasting and scenarios definitions	• Considerable uncertainty regarding future scenarios. Hence, need to keep assumptions transparent and to consider a range of forecasts.
Database and Manual	+3 months	• inability to recover time lost through earlier difficulties	• implications of changes in 'real' tariffs involving additional range of forecasts.
Model and Manual	+3 months	• 4b case studies	
Draft Final Report	+3 months	• Additional case studies	
Final Report	+8 months	• all comments on draft not received until 3 months after end date in original plan. Subsequent prolonged illness of team leader.	• co-ordinating consultants aware of reasons for delays.

5. LESSONS LEARNT AND RECOMMENDATIONS

5.1 Chapter 6 in the Final 'Technical' Report provides the contractors conclusions and recommendations on the next steps.

5.2 As recognised by all parties the Project has been both technically and administratively difficult with consequent delays and resource requirements greater than foreseen.

5.3 Difficulties summarised by the Monitoring and Evaluation Team and raised by the Contractor in earlier progress reports include:

- difficulties of local data collection due to:
  - considerations of confidentiality and national secrecy in some cases:
  - established working practices in the local data collecting agencies;
  - disintegration of former local data collection bureaucratic structures resulting in absence of current data or worse, unreliable data.
- very limited institutional capacity and experience amongst the beneficiary governmental agencies;
- lack of any overall steering committee for study;
- lack of clarity in the beneficiary government departments over the need for long term status of appointment of the local technical partners and their terms of reference and scope of work for the longer term;
- inadequate technical background of local partners;

- A vast regional area over which to prepare strategic forecasts and data sets hindered by diverging transport and general policies and interests in recipient countries.

5.4 Throughout the study there has been continuing evidence of the fundamental dilemma over the project timing. With hindsight the study would have benefited from starting at least six months earlier relative to other Traceca projects and with more advanced groundwork possible including a memorandum of understanding with all beneficiaries regarding project's TOR, local partners and access to data sources before the commencement of the study. An initial stage for the project to establish the harmonisation of data throughout the region would have been useful;

5.5 It is also possible that the project could have usefully been extended to cover relevant institutional development matters;

5.6 One measure of the institutional difficulties mentioned above was demonstrated by an inability on the part of the relevant officers in several of the beneficiaries to appreciate the need for evaluation and prioritisation of investment projects and therefore the utility of the study outputs. This had repercussions on the diligence and openness in preparing the input for the data base and for the forecasts of future economic activity;

5.7 Earlier definition of the core set of projects to be assessed for demand by the study would have enabled better directed and more rapid progress with the project execution. Longer and more thorough project preparation almost always brings benefits in the form of timely project completion.

5.8 Nevertheless, the project has provided the basis for strategic traffic forecasting and data storage and retrieval across the region. Through the technical assistance provided considerable progress has been made in training local technical staff in the principles and application of transport databases, transport planning methods and forecasting models.

5.9 Detailed recommendations are provided in the Final 'Technical' Report on:

- a framework for the continuation of forecasting for Traceca projects based on one or two regional co-ordinating and control centres;

- further development and maintenance of the Traceca Regional Database in order to ensure the database is kept up-to-date;

- formalising of the local partner structure to create local forecasting agencies in order to secure the commitment and support for the project expressed by recipients and to underpin the sustainability of the project with an appropriate organisational framework;

- funding and financial arrangements to sustain the database and forecasting model based on payment for use of these tools by recipients and third parties for evaluation of investment projects including a contribution from Tacis;

- future work for the regional centres and local forecasting agencies to undertake future analysis of strategic investment proposals and tariff restructuring.

ANNEX A

Original Project Programme

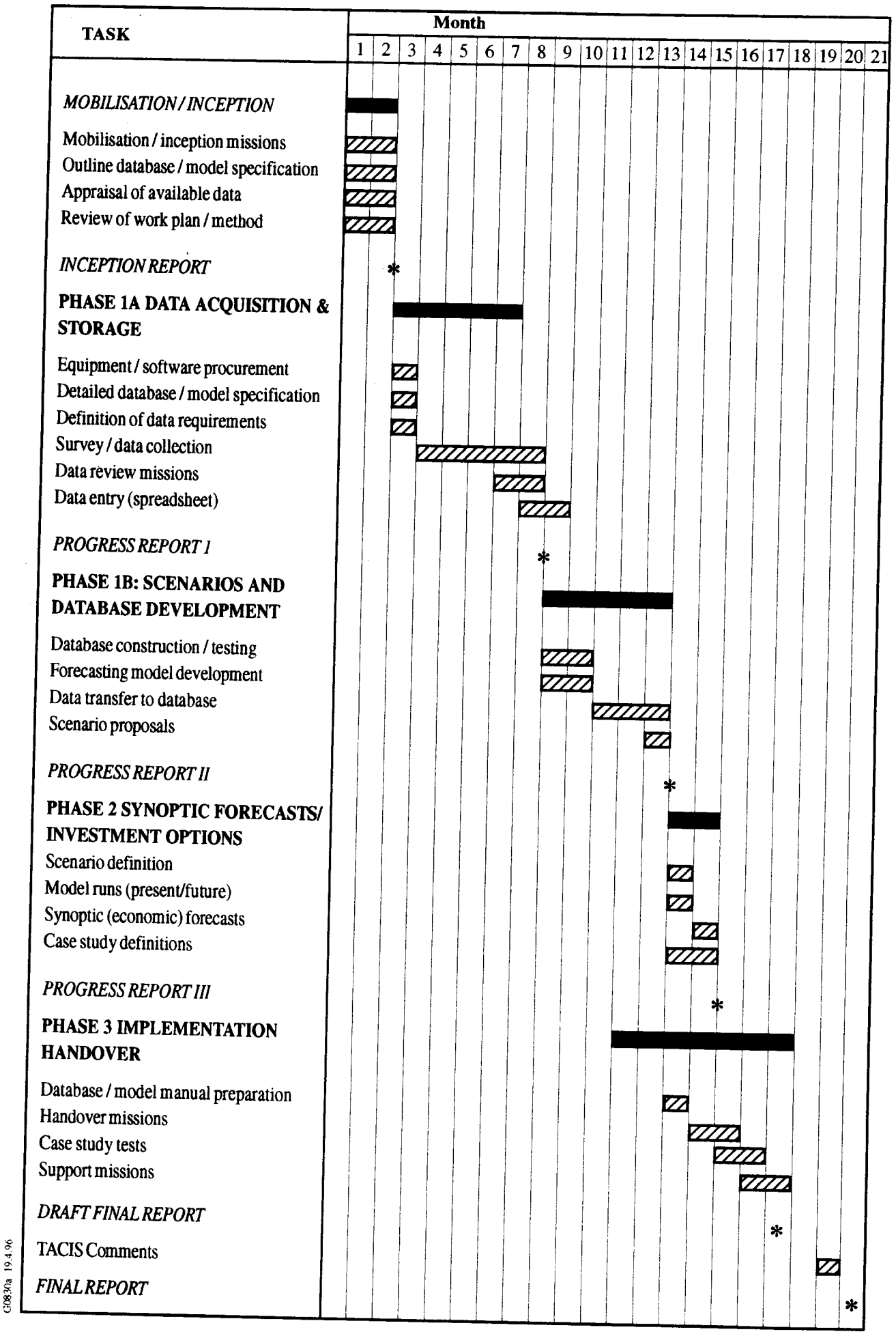

FIGURE A.1: Original Project Programme

ANNEX B

Project Performance Tables For Reporting Period

TABLE B.1

PROJECT PROGRESS REPORT: LAST PERIOD

Project title: Regional Traffic Database and Forecasting Model							Country: TRACECA States									
Planning period: January 1996 - September 1997							Prepared: September 1997									
Project objectives: development and implementation of a traffic database and forecasting model																
NO.	MAIN ACTIVITIES	TIME FRAME					INPUTS									
		1997					PERSONNEL				FLIGHTS				PERDIEM	
		JUN	JUL	AUG	SEPT	1998	EU Experts (weeks)		Local Experts (weeks)		Long Haul (flights)		Local (flights)		(days)	
							Pln'd	Act'l	Pln'd	Act'l	Pln'd	Act'l	Pln'd	Act'l	Pln'd	Act'l
3	SCENARIOS/DATABASE DEVELOPMENT															
3.3	Further data collection/entry	XXXX	XXXX	XXXX			0.5	0.5	20	21						
4	SYNOPTIC FORECASTS															
4.1	Scenario definition	XXXX					0.5	0	4	6	1				5	5
4.2	Zonal economic forecasts						0.5	0.5	4	0						
4.3	Case study definitions	XX					1.5	2	4	6	1		1	1	5	5
5	IMPLEMENTATION/HANDOVER															
5.2	Handover/training missions	XX	XX				10	11	30	60	4	9	10	8	50	50
5.3	Case studies		XX	XXXX			8	8	30	18	4		8	3	25	25
5.4	Support mission		XX	XX			3	2	16	26	4	3	10	3	40	45
5.5	Draft Final Report				XXXX		2	2	5	4						
5.6	Final Report					XXXX										
							26	26	113	141	14	12	29	15	125	130

TABLE B.2

RESOURCE UTILISATION REPORT

Project title: Regional Traffic Database and Forecasting Model			Country: TRACECA States		
Planning period: January 1996 - September 1997		Prepared: September 1997	EU Lead Consultant: WS Atkins International Ltd.		
Project objectives: development and implementation of a traffic database and forecasting model					
RESOURCES/INPUTS	TOTAL PLANNED	PERIOD PLANNED	PERIOD REALISED	TOTAL REALISED	AVAILABLE
PERSONNEL (Weeks)					
EU Experts	132	26	26	176	-
Local Experts	520	113	141	448	72
FLIGHTS (Tickets)					
Long haul	25	12	12	50	-
Local	90	29	15	78	12
PER DIEM					
Days	600	125	130	612	-

TABLE B.3

OUTPUT PERFORMANCE REPORT

Project title: Regional Traffic Database and Forecasting Model		Country: TRACECA States	
Planning period: June 1997 - September 1997		Prepared: August 1998	
Project objectives: development and implementation of a traffic database and forecasting model			
Output results	Derivation from original plan (plus ..... - months for submission of deliverable)	Derivation from revised plan	Comment on constraints and assumptions
Database and Manual	+ 3 months	0	Handover to local partners necessitated full co-operation and participation during holiday period (August). Achieved, although some difficulties with co-operation between TRACECA countries.
Model and Manual	+ 3 months	0	
Handover/Training/ Support Missions	+ 3 months	0	
Cast Study Tests	+ 3 months	0	
Draft Final Report	+ 3 months	0	
Final Report	+ 11 months	+ 8 months	All comments on Draft Final Report not received until 3 months after end date in revised plan. Subsequent prolonged illness of Team Leader

ANNEX C

Local Partners

C. LOCAL PARTNERS

C.1 **Armenia:** data collection undertaken by the recipient organisation. Initially we had proposed to adopt the Engineering University as technical partner but the recipient organisation preferred to retain responsibility for the work with a view to creating a specialist TRACECA team with experts seconded from various specialist institutions. The creation of this team has not materialised to date. The database and model training has been undertaken by representatives of the Ministry of Transport who have computing skills.

C.2 **Azerbaijan**: data collection and validation together with training in the use of the database and model was undertaken by the Railways computer centre. The recipient provided an input to the economic forecasting.

C.3 **Georgia:** data collection and validation undertaken by the Centre for Government Statistics in co-operation with the Institute of Economy and Marketing. This Institute of Economy was nominated as our local technical partner for much of the project and has undertook economic forecasting work. However, since the project started a Ministry of Transport has been created and decided during the course of the study to appoint its own staff to take a lead role in the database and model training. Mr Kgirtskaya, Head of Division of Information, was assigned to the position of operating the database and model (combining his analytical and computer skills with his experience of the transport sector).

C.4 **Kazakhstan:** data collection, data processing and validation was undertaken by our local partner the Research Institute for Transport (AO-NIAT). Surveys to establish freight costs and economic forecasting were also undertaken. This partner was appointed with the approval of the recipient at the outset of the project. The capabilities of this institute have enabled us to involve technical staff in the co-ordination and processing of data sets for all countries. Moreover, during the course of the work, staff contributed to the base year model development work including the translation of a modified software manual tailored to the TRACECA model. In addition the University participated in economic forecasting work.

C.5 **Kyrgystan:** data collection and validation undertaken by the local technical partner the State Institute of Road Design (Kyrghzdortransproekt). This partner was selected following discussions with the Ministry of Transport and, whilst it has little experience in multi-modal forecasting, has demonstrated a high level of motivation (which is also reflected through its success in winning contracts in international tenders). The Institute nominated staff for participating in the database and model training.

C.6 **Tadjikistan**: at the outset of the project the State Project and Research Institute "Tajikgipro-transstroy" was designated the recipient as our local technical partner. The Institute has undertaken data collection and validation and participated in the database and model training sessions.

C.7 **Turkmenistan:** initially the Turkmen Institute for Transport and Communications was considered to be an appropriate technical partner. However, the recipient organisation took direct responsibility for data collection and nominated the Institute of Economy to participate in the project. This Institute reviewed the economic forecasts and has participated in the database and model training. Representatives of the railways also participated in the training and handover sessions.

C.8 **Uzbekistan:** data collection was undertaken by a range of organisations including the University and the Institute of Economy with assistance from the Cabinet of Ministers. After protracted discussions with the recipient, our official local technical partner, Uzavinformtransystema, was appointed to the project in December 1996. This partner undertook work on comparative freight costs and participated in the database and model training. In addition Professor Ujabiev from the University and Institute of Economy participated in training seminars and workshops. The local technical partner is proficient in database operations but beyond the project may require improved access to trade and rail data. This could possibly be achieved by seconding or appointing appropriate specialists from other institutions to work on the project.

C.9 All partners participated in seminars and workshops designed to train them in the application of the database and model.