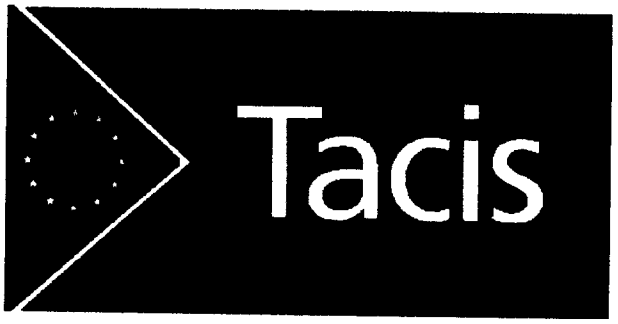

TRACECA : Rolling Stock Maintenance - Railways TNREG9309

Inception Report

May 15th, 1996

Project Title		TRACECA - Railways : Rolling Stock Maintenance	
Project Number :		TNREG 9309	
Country	:		
		Local operator	EC Consultant
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Date of report :		15 May 1996	
Reporting period :		Inception Report	
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TACIS Bureau [task manager]	_____ [name]	_____ [signature]	_____ [date]

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1. Project Synopsis

Project Title		:TRACECA - Railways : Rolling Stock Maintenance
Project Number		:TNREG 9309
Country		:All TRACECA Countries
Project starting date	:	6 March 1996 (effective date of the contract)
Project duration	:	12 months (from the effective date of the contract)

Wider Objectives :Improvement of the rolling stock maintenance of the railways companies in the TRACECA countries, enabling them to operate the TRACECA corridor in the short term and ensuring continuity in the long term.

Specific Project Objectives :

- Short term recommendations for the maintenance management of each country, and to propose immediate actions to be undertaken on the rolling stock, on its maintenance or on the management of the supply of spare parts, equipment and vehicles.

- Proposal for long term investment plans for maintenance facilities and recommendations for the supply of spare parts, in both cases, whenever possible, within the framework of a market-oriented railway system.

- Transfer of know how in management of rolling stock maintenance

Planned outputs : Analysis of the current situation of the rolling stock and its maintenance, rolling stock maintenance management and organisation (detailed for one of the TRACECA countries), including an assessment of economic and commercial aspects : facilities and enterprises for rolling stock manufacturing and maintenance, and for spare part production

Future requirements for new rolling stock and future rolling stock maintenance requirements, which will be based upon traffic and operational forecasts and rolling stock projections ;

Proposals for future maintenance strategy and a development plan for construction or upgrading of major workshops ; the development plan will include organisational , financial and economic evaluations as well as aspects of restructuring, capacity balancing and task distribution ;

Case study, consisting of an economic feasibility study of one proposed development project covering at least two state railways and deeply involving local staff ;

Local seminar, attended by two key persons of each of the railways, with two major subjects, viz., maintenance policies practised in western railway companies and discussion of the proposed maintenance strategy ;

A two week study tour for the two key persons of each of the railways, with two major subjects, viz., organisation and execution of rolling stock maintenance in western railways and familiarisation with western technology.

Project activities :

Phase 1 :Analysis current situation
1A : Mobilisation
1B : Site survey
1C : Case study initialisation
1D : Site survey synthesis

Phase 2 : Forecast of the maintenance requirements
2A : Traffic forecasts
2B : Operation forecasts
2C : Rolling stock requirements
2D : Maintenance requirements
2E : Manufacturing requirements
2F : Comparison with current situation and studies in progress
2G : Maintenance strategy

Phase 3 : Final requirements
3A : Local seminar
3B : Study tour
3C : Strategy alternatives for maintenance
3D : Maintenance strategy
3E : Case study
3F : Investment plan

Inputs : EC technical assistance inputs will include: 35 months experts in management of rolling stock maintenance, in rolling stock operation and economist, the organisation of a local seminar with relevant supports and a visit to western rolling stock maintenance facilities.

Inputs should also include : results from other projects, mainly, the " Regional Traffic Forecasting Model ", and " Infrastructure Maintenance - Railways" and other reports of preceding studies

2. Analysis of project

2.1 Relevant Project Context

The " Brussels Declaration " expresses needs to :

- Promote the Central Asia - Trans Caucasian - Europe transport corridor ",

- Identify problems and deficiencies in the Region's trade and transport systems.

The main objectives of this project aims at establishing in the shortest time, and for the eight countries of the TRACECA corridor, the relevant railways rolling stock fleet required to operate such a corridor, mainly for goods transport, and at defining the means which could allow the regional authorities to maintain this fleet reliable and available.

Generally speaking, the fleet of every type of vehicles is more than required but this rolling stock is often in poor condition, either because the vehicles are old or because the maintenance could not be performed properly. Some of the countries have inherited to a rather ofd fleet, and the whole types of locomotives and passenger coaches are also designed with old technologies even though some of them are pretty new.

As the rolling stock fleet is more than enough to cover the operation for a short term period, some of the vehicles are stored on yards. However, the available fleet is not well known and actions should be undertaken to upgrade part of the idle fleet to complete the existing fleet already in operation.

Purchase of new rolling stock should be planned for a medium term to take place of the oldest rolling stock or to complete the fleet with the increase of the demand of traffic. Therefore, the first actions to be taken should be taken to improve the maintenance in order to recover the suitable conditions of the rolling stock and to maintain it at the lowest cost possible so as to be affordable.

During the Soviet Union management, the maintenance was centralised in the Ministry of Railways of Soviet Union based in Moscow, in a star frame organisation. After independence the organisation was cut, leaving each country on its own management with the ownership of the fleet of vehicles and maintenance facilities present at that time on their territory.

The distribution of facilities does not always fit with the requirements of the rolling stock fleet of each state and, for instance, state as KYRGHYZSTAN which was depending on the facilities of KAZAKHSTAN is not yet fitted with the minimum facilities, and other countries owned oversized facilities for there current requirements.

The maintenance management was centralised in the ministry of railways of the Soviet Union, and all documents related to rolling stock characteristics, design, list of spare parts, maintenance procedures have not still been dispatched to each country. The relevant knowledge of the rolling stock design, is still in the former headquarters, and, when the qualified personnel was present in the local workshops, ministries or transport institutes, the independence has created a movement of this qualified personnel who, now could have let the regional authorities or workshops without the relevant qualification to manage the maintenance or to perform surveys and analysis and to take the required decisions which could be deem necessary.

The management of spare parts was also carried out by the headquarters of the Soviet Union, and most of the spare parts came from Russia or other countries. and nowadays each country should pay to the other in foreign currencies which they do not have, and they face difficulties to manage the supply of spare parts.

Moreover, the former controlled economy did neither optimised the production of vehicles, nor the productivity in their maintenance, which had led to the following consequences :

- The fleet of locomotives and wagons is over than required, no more production is needed and most of the Russian or other plants are closed or tried to maintain a minimum production, but in the meantime some countries own an old fleet of rolling stock ;

- As a consequence, some of vehicles (locomotives, wagons and passenger cars) are under used or stored in unsafe yards, their conditions are not well known, there is, certainly, technical resources to be used, but the conditions of this idle fleet is quickly decreasing ;

- The maintenance was certainly well adapted but over dimensioned, the production of spare parts was more than enough which has led to an over consummation. After independence, the budgets of the maintenance have been restricted, the maintenance procedures have not been updating accordingly, which leads to overcosts in some of the maintenance activities when some others cannot be carried out due to lack of spare parts and money to buy them ; nothing have yet be done to analyse updating in relation to current results and actions to be done in that organisation ;

As a result, the current situation on the budget of railways authorities do not allow them to undertake the maintenance as it was planned, and consequently, the reliability of the rolling stock is drastically decreasing the maintenance is no more over dimensioned due to the use of second hand spare parts taken in spare rolling stock and self sufficient methods of maintenance, the required tasks are not well done.

During the first site survey, most of the local authorities have expressed the same difficulties and deficiencies which could be summarised as :

- Lack of money to ensure the maintenance as planned ;

- Lack of specific facilities on their territories.

Each of them does not see any advantage to buy to neighbour countries than to buy to former suppliers.

Due to lack of the relevant information, knowledge or budget, none of them has undertaken comprehensive studies to have a better knowledge of their weaknesses and strengths in their maintenance organisation and procedures.

The former centralised maintenance organisation was certainly well adapted to the operation of the Soviet Union network, and few of the local authorities seem to believe that an upgraded maintenance organisation could solve some of their difficulties and most of them are only expecting money to buy spare parts from their former suppliers, therefore, among them it is rather difficult to find enthusiasm for that project. Meanwhile, in every country, we have found some interest from workshop management and work forces.

However, most of them independently have undertaken studies for implementation of new facilities or improvement of old facilities with different objectives according to their own situation . Some of them are holding negotiations with foreign investors to implement new plants on their territories.

As the rolling stock maintenance is directly related to the production to be served in terms of ton x km and passenger x km, and, the geographical and economical characteristics are very different from one country to the other ones, the requirements of rolling stock fleet and its related maintenance, are accordingly very different, the wider is the country, the higher are the requirements.

The political and strategically positions which are crucial for operation and legal relationships are not predominant for rolling stock maintenance.

As passenger services are concerned, most of the countries expressed their interest in maintaining passenger services. The 70 years of Unions have mixed and moved people who are still really dependant on railways links even though those links are uncomfortable and low. It should be an error to take into consideration only freight services which certainly should ensure profitable commercial links between Europe and NIS countries.

As another external input in the conditions of the rolling stock, it was expressed by most of the authorities, that infrastructures do not have the required conditions for a safe and reliable operation. Not only the bad conditions of infrastructures increase the weaknesses of the rolling stock, but also, they oblige the operation management to reduce the speed limits. Therefore, the average speed of trains are never over 50 km/h for passenger trains and 30 km/h for freight trains.

The low operational speed will be a limitation in the railways profitability, in particular, that situation required a larger fleet of rolling stock to deal with a given service, which consequently involves higher costs in investment for rolling stock maintenance facilities and in maintenance activities.

As an approach of the different networks, Central Asia and Caucasus are different :

- The Caucasus networks are widely electrified with 3000 VDC, while

- The Central Asia networks are widely operated with diesel locomotives, the electrified sections of their networks are electrified with 25 000 V 50 Hz.

Therefore, the backbone of their fleet of locomotives are different : the Caucasus countries operate twin or single " BB " locomotives built in TBILISSI plant, their diesel locomotives which do not operate the main services were provided among the oldest ones of the Soviet Union, while the Central Asia countries operate mainly twin " CC " locomotives built in UKRAINE. In most of those countries the availability of the locomotives does not allow the management to assign the different kind of locomotives to services for which it were designed, for example, twin " CC " locomotives could hauled a standard passenger train.

In the Caucasus countries it was noted that part of the locomotive fleet are reaching their time life, but it is considered, as it is often considered all over the world, that the operation of locomotives could be extended over the time life when economical situation deems it necessary. In that case, particular attention should be paid in maintenance activities in order to ensure the required availability and reliability of the vehicles.

In the Central Asia countries, it was also noted the particular situation of KYRGHYZSTAN railways which is expecting assistance to electrify its short network since this country produce hydro-electricity and, in the mean time they should buy oil for their diesel locomotives.

2.2 Main difficulties and deficiencies

2.2.1 **Counterparts**

Due to the wide area to be covered and the high number of countries involved, and due to the short time and the rather short resources available to perform the studies, it is a great deal to involve deeply counterparts from every country. It would be disappointed not to be able to involve local authorities as they could expect to be.

In the proposed organisation for the transfer of know how (c.f. paragraph 3.4. hereafter), a tentative program will be developed to set up the best possible cooperation with counterparts.

2.2.2 **Data collection**

The fleets of locomotives are relatively well known, but as the fleet of wagons was formally managed by the central ministry of railways of the Soviet Union and there are affected to any local entity, it will be very difficult to carry out a survey of those wagons.

For all kind of vehicles, when the fleet is known, their conditions and reliability are not well. The difficulties to get the relevant information from the local counterparts is mainly due to their own difficulties to get information and sometimes due to an old reluctance to provide data resulting of 75 years of work under very constrained conditions.

The surveys performed in close co-operation with local representatives will allow cross checking a collected data with visit to the depots which would enable the team to get data with enough accuracy and reliability for the level of the project. Analysis of former studies would bring additional and useful data to evaluate the conditions of the rolling stock fleet.

2.2.3 Logistic

The wide area to be covered involved a lot of travels between countries, which are organised with some difficulties due to lack of communications : few flights allow the experts to reach Caucasus to Central Asia.

The management of the project will aim at saving travel time by limiting the trips between countries to the smallest quantities of experts.

Among the difficulties it should be mentioned the difficulties to communicate for non Russian speaking people, even skilled translators are available everywhere, the difficulties in communication is time consuming and could get confusion.

2.2.4 Coordination with other projects

A lot of projects are linked together or dependant from other ones, but, again the wide area to be covered and the great number of projects involved, the required coordinating meetings are difficult to plan. It would certainly be difficult to get all the interesting data from all the other projects, some tasks will be developed in parallel, when other will be under developed.

Thanks to the actions of the TACIS co-ordinating units, relationships between experts are encouraged and will limit those difficulties.

2.3 Situation of local operator

Most operators are under the responsibility of Ministry of Transport (or Transport and Communication). All of their regional representative show a great interest in this project. In some countries, full delegations are given to railways company (or railways departments), In all cases, the regional authorities are expecting short terms actions from the project, for several of them, they have already taken decisions to improve the organisation of railways maintenance.

Few of them mentioned that they have already led updates on their organisation to cope with the new difficulties involved by the new structures. Nevertheless, they are less willing to participate but accept some inputs from our side. In those cases, we face more difficulties to get information.

2.4 Target groups

The project intend to analyse and propose improvement on rolling stock maintenance, in particular in management and distribution of facilities all over the eight TRACECA countries, therefore. our counterparts should be from the top level of the management of the railways companies and from the ministries of transport and communication.

In order to ensure a useful cooperation between EU experts and local authorities it is essential to work closely with two representatives from each country.

During the data collection phases, experts, workshop managers and factories managers should be mobilised, as well. The two representatives will analyse the data collected with EU experts.

Those two representatives will participate in the local seminar and the visit to Paris, and they will participate in all analysis and presentation of alternatives for improvement.

2.5 Commitments

During the first trip all around the TRACECA countries, the team leader had the opportunity to present the methodological approach of the project, in particular, attention was paid in the choice of the representatives. It was not required that those representatives should be appointed at that moment, but there were requested for the second stage of the study.

For the time being, some of those representatives are known and others are expected.

Meanwhile, the following list of representatives were contacted and expected to attend the local seminar and the study tour or expected to appointed representatives, they are :

- ARMENIA

Mr V. V. ASRIYANTS	General Director Ministry of transport and communication
Mr AKOPIAN	Deputy General Manager Armenian Railways

- AZERBADJAN

Mr MAMEDOV	Deputy Director Azerbadjan Railways
Mr M. S. PANAHOV	Deputy Chief of Economics Azerbadjan Railways

- GEORGIA

Mr A. V. CHKHAIDZE	Chairman of Georgian Transpt coord. council Chairman of Georgian Railway Transpt Dept
Mr TARIEL GEORGIEVIG	Director I. B. STALINE's Workshop

- TURKMENISTAN

Mr M. S. YAZBERDIEV	Head of Department Ministry of Transport and Communication
Mr H. HALIKOV	Chief of Railways Turkmenistan State Railways

- UZBEKISTAN

Mr. Valery DAVIDOVICH	Chief of Service of Department of International Communication
Mr. Navrus ERNIKOV	Deputy Chief of Service of Department of International Communication

- KYRGHYZSTAN

Mr.T. A. TAKYRBASHEVICH	Deputy Railway Director
Mr T. Z. KHALILOVICH	Deputy Railway Director

- KAZAKHSTAN

Mr TARANENKO	Chief of Board of Development of Transport Ministry of Transport and Communication
Mr M. URAZBEKOV	Chief of Div. of Railways Transpt Dept Ministry of Transport and Communication

TADJIKISTAN (people met by one of our experts during its visit in May)

Mr V. BOLTOV	Deputy Minister of Economics
Mr M. HABIBOV	Chief of Tadjik Railways

3. Project planning

3.1 Relation/co-ordination With Other Projects

The main inputs coming from other project are related to :

- The " Regional Traffic Forecasting Model " on the TRACECA corridor. In the framework of the Rolling Stock Maintenance project, it is intend to analyse the results of this Traffic Forecast project to evaluate the required fleet of vehicles.

- " infrastructures maintenance Railways - Caucasus " and " infrastructures maintenance Railways - Central Asia " will certainly bring sufficient characteristics to modify widely the travel times through the TRACECA corridor, those data will enable the team project to determine the fleet requirements for operation.

3.2 Project objectives

No major modifications are requested. Some reviews on the levels of the recommendations are proposed.

As one of the main objectives, the whole TRACECA projects intend to operate a corridor railway line through the Central Asia and Caucasus countries, therefore, the Rolling Stock Maintenance project should give recommendations to ensure the availability and the relevant reliability of the fleet of rolling stock.

All recommendations will be drawn up in close co-operation with local authorities in order to ensure the agreements of the beneficiaries of the project and to perform the transfer of know how which is the base of a mutual understanding and a must for durable co-operation.

All recommendations will be analysed for a market oriented approach as much as possible. It is obvious that it would be difficult to propose a complete private involvement in the maintenance of the rolling stock for a short term goal.

For each field of rolling stock (viz., vehicles, maintenance and spare parts supply), the objectives of the project should be split in short and long terms recommendations.

- Rolling stock

  Short term : main actions to be taken in a short term period to provide the relevant fleet to each country enabling them to operate the TRACECA corridor, and to provide them with the relevant fleet of vehicles according to their technology (diesel, DC locomotives, AC locomotives), their requirements (passengers coaches, tank wagons, platform wagons,...). For the whole TRACECA area, it will be determined which kind of locomotives, passenger coaches and wagons should be scrapped, refurbished or constructed.

  Long term : recommendations will be given on the choice of technologies for the rolling stock and the expected consequences on its maintenance.

- Maintenance

  Short term : recommendations which enable to upgrade and to maintain the existing rolling stock in standard conditions, the recommendations will be given in terms of :

  - Management of railway maintenance : framework of organisation, institutional relationship and management of the rolling stock maintenance and operation authorities

- Investment plan for improvement of existing facilities, construction of new ones, and investment plan for major equipment. The investments to be proposed should be adaptable to any new technologies or should be economically viable for the existing technology

  Long term : investment plan will be proposed to deal with future technology which could bring some inputs in the recommendations for new maintenance facilities,

- Spare parts

  Short term : recommendations on an organisation of spare parts local production according to the local industry capabilities and the economic feasibility in relation to the durability of the technology.

  Long term : investment plan for construction plants for locomotives, coaches and wagons according to the technologies proposed for a future rolling stock.

3.3 Project Approach

3.3.1 **Modifications bring to the methodology of the proposal**

No major modifications are planned on the methodology, some reviews of the staffing plan and organisation between the activities are proposed in order to allow a best monitoring of the project.

The project intended to evaluate the condition of the rolling stock and the maintenance facilities in order to give recommendations to solve rolling stock and maintenance difficulties and deficiencies. As it was already stated, the first priority will be to propose maintenance improvements in order to be able to operate a TRACECA corridor in a short term period.

The difficulties to solve all the problems in the whole area will not allow the project team to assess accurately the rolling stock conditions and to perform a comprehensive survey of the vehicles in order to be able to determine which could be refurbished, which should be scratched and how much should be purchased.

Due to schedule control management, some of our experts were no more available to perform their tasks as it was planned and some other experts were proposed The main modifications have been brought in the staffing plan and the participation of the EU experts.

During the performance or at the end of the project, amendment to this project could be proposed to perform detailed feasibility studies or private sector involvement analysis.

Another modification is proposed to shift the countries concerned by the case study. For several reasons developed hereafter, in paragraph 3.3.3, it is proposed to perform the case study in 2 or 3 countries of Central Asia while the seminar will be done in one of the Caucasus countries, which it is not a modification from the Terms of Reference but from our own proposal.

3.3.2 **Methodology**

The terms of reference and consequently the SYSTRA proposal described all tasks to be done on the rolling stock, then the tasks to be performed for the maintenance, and the supply of spare parts, the reviewed proposal for organisation of the tasks fits with the time schedule where surveys, forecasts, recommendations are performed successively and rolling stock, maintenance and supply of spare parts are performed in parallel.

Moreover, the following organisation proposed a task description of which task references can be found in the Project organisation chart (section 3.7) and the Detailed plan for operation (section 3.9).

So, it is proposed to split the project in 3 phases :

- Phase 1 : analysis of the current situation,

- Phase 2 : analysis of the future requirements and recommendations

- Phase 3 final requirements

3.3.2.1 ***Phase 1: Current situation analysis***

1A. Mobilisation

Mobilisation of the team and analysis of the context of the project. The meeting held in Brussels on February 21st was the starting date of the mobilisation..

1B. Site survey

The activity goals are to collect main data on the conditions of works and travels in the whole area, to precise the expectations of the local authorities, and to get an overview of the current conditions of the railways, and to initialise co-operation with counterparts.

This activity will be performed by the team leader. The data collected will enable him to : precise or propose the main objectives of the project, propose an organisation in the assignments of the experts, and to define a framework for the management of the project.

1 C. Site survey

Taking into account that the five rolling stock experts, maintenance experts and spare part supply experts have the same background, it was preferred to spilt the team into five teams where each of those five experts have visited one or two countries during 10 to 15 days.

Therefore, during those 10 to 15 days each of those five rolling stock experts will have worked in close co-operation with the local railways authorities of one of the eight countries, so as to collect data on the conditions of the rolling stock, the fleet available, the management and the organisation of the maintenance, the main difficulties encountered in the maintenance of the rolling stock and the actions planned or undertaken to update the current organisation and supply of spare parts The activity 1B will provide guidelines to the experts to work in close co-operation with the representatives of each of the eight TRACECA countries (c.f. " Target groups " section 2.4) After completion of the local survey, coordinating meetings will enable the team to gather information and summarise the main deficiencies encountered all over the region. (c.f. 1 E.)

1 D. Case study initialisation

The site survey should bring enough information and discussions with local authorities to determine the subject and the attendants of the case study. As it is stated below, the case study will be performed in parallel with the others activities, it will be completed at the end of the project.

1 E. Site survey synthesis

Further to the site surveys performed by the rolling stock experts in each TRACECA country, and further to the analysis of the available previous studies, coordinating meetings will determine the forces and weaknesses of each network. A comparative analysis of the data collected will summarise the expectations, the deficiencies, the actions already taken in each of them to deal with their own problems. Each country has set up a maintenance organisation for their rolling stock, the efficiency of this maintenance depends mainly on the distribution of the facilities located on their own territories and the local production of the industries. First recommendations and initial synergy could be planned from this stage.

A synthesis report will be issued at the end of this activity.

1 F. Inception report

The inception report will be issued during this first phase of the project. However, the duration of this first phase will be over than two months, the report should have been issued before the completion of the phase even though it would have been useful to get results of the site survey and to hold enough discussion with local authorities to identify clearly the objectives, the expected outputs and the deficiencies of the project.

3.3.2.2 ***Phase 2 : Requirements forecasts***

2 A. Traffic forecasts

This activity will consist of a thorough analysis of the results of the TRACECA project : " Regional Traffic Forecasting Model ", which will give the inputs to the project. Selection of relevant data and conversion in terms of traffic offer will be performed in order to determine the required fleet of each kind of wagons and locomotives. The outputs will be given in ton-kilometres to be served for different kinds of goods in order to be able to define the different kinds of wagons to be supplied.

2 B. Operation forecasts

This activity will determine the operation parameters to enable the calculation of the rolling stock fleet.

In one hand, the conditions of railways infrastructures in a short term period and further, in a long term period, will define the average speed to be expected on the different sections of the lines. This average speed mainly depends on the speed limitations given by the conditions and layout of the track, the available double sections, or the shunting track for train crossings. In an other hand, the organisation of operation, mainly the interface with passenger trains will precise the constraints for freight trains movements, and therefore, the time schedule limitations. All operation characteristics have a major input on the calculation of the fleet of each kind of vehicles.

According to the organisation chosen for the operation of the freight trains in each country and between the countries, the fleet of wagons and locomotives should be corrected accordingly. At the stage of the study, an organisation would have been proposed to minimise the quantity of rolling stock and to optimise its maintenance.

It will be paid a particular attention to propose an organisation would facilitate an integration in a market-oriented system (e.g. private management of wagons for specific industries, or private management of inter-modal transport).

2 C. Rolling stock requirements

So defined, the traffic forecasts and the operation organisation, the fleet of each kind of wagons and locomotives could be determined. At this stage, it should be considered the technologies of the infrastructure section lines for the current situation and the future one : plan for electrification is, obviously, a major input in the definition of the fleet of locomotives.

The activity 1 E, will have determined the conditions of the existing rolling stock, the current available fleet and consequently, the main needs of purchase of new vehicles. This activity should define the quantity of vehicles required as well as orientation on a technology to be applied for the new ones.

Moreover, the economic activities of all those countries, as well as, the implementation of new infrastructures proposed, are not well known, the fleet so calculated should be considered with a lot of care, safety coefficients should have been taken.

2 D. Maintenance requirements

According to the fleet of each type of vehicles determined in the previous activity, the technology of those rolling stock, the infrastructures improvements planned (e.g. construction of double tracks), a distribution of workshops required to cope with the relevant maintenance will be defined. Taking into account the wide fleet of rolling stock existing in the whole area, the distribution of workshops should certainly have to cope with the existing technology, the evolution towards a new one should be taken into consideration.

A limited number of standard workshops will be proposed in order to be distributed in the whole area of the study An estimate of the capacity of each workshop will be performed, it will depend on the technology of the rolling stock and the organisation of the maintenance and the supply of spare parts.

2 E. Manufacturing requirements

The organisation of the maintenance will have to precise the production expected for each kind of workshops in term of quantity of equipment to be maintained and in terms of types of equipment and tasks to be performed and spare parts to be produced. Those activities being defined, the manufacturing requirements could be appraised.

Spare parts, equipment or vehicles could be produced or maintained by regional manufacturers. The resources and time allocated for this study, will not allow to draw up a detailed list of spare parts, equipment or vehicles to be produced (the rolling stock is constituted by hundred of different components), but the outputs of the project will give strategy alternatives for regional manufacturing.

2 F. Comparison with current situation and studies in progress

The task 1 C. will have performed a survey of local conditions and actions taken by the different countries to deal with their own deficiencies, and to take advantage of their own capabilities and the existing facilities. The recommendations on the implementation of new facilities and on the improvement of management, organisation and equipment should take into consideration the existing situation and the different plans of actions. It has been noted that several countries have developed projects which certainly be complementary. Some of those projects have not been studied or completed due to lack of money or relevant specialists.

2 G. Maintenance strategy

The requirements defined in the tasks 2 C., 2 D., 2 E. corrected by the task 2 F. will be analysed in order to define an overall strategy for the whole area on maintenance management and organisation of the sector, as well as improvement and construction of maintenance facilities and spare parts supply policy.

The strategy proposed will be based on a market-oriented organisation with objectives to facilitate introduction of the private sector in production of equipment and maintenance of equipment or vehicles, for the medium or long terms

This activity will propose a general program for the whole area, this program will be discussed and analysed with all representatives of the eight countries during the local seminar.

3.3.2.3 ***Phase 3 : Final requirements***

3 A. Local seminar

c.f. " Seminar and case study " below

The purpose of the local seminar will be a presentation of several maintenance policies in force in western countries. Moreover, it will give the opportunity to discuss and to explain the market-oriented general strategy proposed for the TRACECA corridor.

3 B. Study tour

The study tour in Paris will give the opportunity to the 16 representatives of the local authorities to get concrete examples of the general strategies proposed during the local seminar and to visit facilities fitted with the relevant equipment in relation to the chosen organisation. It will be presented on concrete example an economical analysis on the maintenance costs savings involved by such strategies.

New technologies of rolling stock and their consequences on the costs of the maintenance and operation will be presented.

3 C. Strategy alternatives for maintenance

The general strategy analysed and amended during the local seminar will be developed and applied to each of the eight countries. Management, organisation, implementation, reconversion and improvement of facilities will be adapted to each country.

A tentative estimate of the costs involved will have to be performed.

3 D. Maintenance synergy

During the analysis of the application of the general strategy to each country (3 C.), it will be performed an analysis of the synergy between those countries in the production of spare parts, or in specific or overhaul maintenance of certain types of rolling stock. Some initiatives are already in progress in several countries.

3 E. Case study

The case study initiated in the 1 D. activity and developed during the whole project will be completed with the local counterparts involved in this specific study.

3 F. Investment plan

Further to activity 3 C., this activity will summarise the needs for investment and will give tentative priorities in this investment plan. It will be analysed the possibilities of western participation.

3 G. Final report

The final report will summarise the outputs of the project. It will proposed an action plan for the implementation of the recommendations of management and organisation and the further stages of studies for the construction and modernisation of the maintenance facilities.

3.3.3 **Seminar and case study**

In order to involve in specific topics the both regions of the TRACECA corridor, the Caucasus region and the Central Asia region, it is proposed to organise the local seminar in one of the countries of one region and the case study in one or two countries of the other region.

Taking into consideration the relatively homogenous characteristics of networks and rolling stock of the three Caucasus countries and the location in TBILISSI of the only factory of rolling stock in the TRACECA corridor, it is proposed to lead the local seminar on rolling stock maintenance management in TBILISSI.

The seminar will introduce maintenance concept used in European countries It will be paid a particular attention to the technology of the rolling stock and the local conditions of operation which have a major impact in the maintenance organisation.

The existence of the rolling stock plant of TBILISSI will give the opportunity to analyse and to lead discussion on the construction of rolling stock and its related spare parts. New technologies of rolling stock could be briefly introduce in order to be able to analyse their related new concepts of maintenance and the savings which could be expected from those new technologies.

The local seminar will also give the opportunity to present strategy alternatives for future maintenance organisation in the TRACECA corridor. Those alternatives will be analysed with the representatives of the eight countries concerned.

In due consideration to the wide range of types of rolling stock and maintenance in Central Asia and in particular in the largest country of if, the KAZAKHSTAN, it is proposed to analyse deeply one of the proposed alternatives of one of the maintenance subjects of this country.

The subject will concern the maintenance of the diesel locomotive, it could be linked with the requirements of a neighbour country. The case study will complete the investment plan carried out for each country, by analysing the economic feasibility of the chosen subject.

3.4 Transfer of know how

3.4.1 **Objectives**

Bring to the Beneficiaries States the knowledge of Western approach in management, economical and technical fields.

Training in requested fields by active participation in the Project

3.4.2 **Organisation of the transfer of know how**

It is required to have a complete follow up of the Project by one or two local experts even though some other experts are involved only in specific stages. Those one or two experts will benefit of the overall development of the studies and will participate in the local seminar.

It is compulsory that local experts produce their own reports which will be discussed with EU experts which will ensure a total involvement of those experts and a feed back on their training.

During the performance of the data collection, the local experts will prepare documents useful to get a relevant knowledge of the local conditions and to bring the required data which enable the team to reach reliable results. The EU experts will bring their own documents and knowledge and will propose their approach to local experts. They will bring explanations and courses when ever required.

In particular, the local experts will collect data, visit and report to the team leader on the conditions and development possibilities of the existing workshops and local industries which could be involved in the production of spare parts for rolling stock. They will collect data on operation results and maintenance production and will carry out the useful statistics required for the project.

During the preparation of proposals for further development, the local experts will join the EU experts in the discussions, they will bring the local appreciation and comments to the proposals in order to make them applicable. They will produce their own part of the reports whenever possible.

In particular, they will comment on the technical feasibility and will bring the relevant data which allow the team to give an economical assessment of the alternatives proposed. Then they will be able to describe the proposals for development. Whenever required, they will present to local authorities the progress of the works and the reports.

All along the progress of the studies the EU experts will explain their own economic and management approach and will lead discussions on these approach in order to ensure a progressive agreement on the proposals.

Obviously, the wide area to be covered and the rather reduce budget allocated for local participation, the transfer of know how could not be performed equally in every country :

- The data collection will be performed with the same organisation in each country, local experts on each country will participate in data collection and in the analysis of the local maintenance conditions ;

- Traffic forecasts and operation organisation could not be led in each country, the analysis should be performed in one of the Caucasus country and in one of the Central Asia country ;

- Preparation of alternatives for further development should be performed with the complete EU team, of whom the experts will have collected and analysed maintenance conditions and facilities in each country, participation of local experts will be applied whenever possible, the participation of the experts of one particular country will be avoided so that no oriented results could be blamed.

- The local seminar will gather all local and EU experts, it will give the opportunity to discuss the approach chosen for the rolling stock maintenance in the all area, and, to discuss specific points ;

- The case study will interest the one or two countries involved in this specific study.

3.5 Constraints, risks and assumptions

3.5.1 **Market oriented approach**

One of the main goals of the project, it will be present in every analyse, in every recommendation, in any proposal for improvement. However, to be realistic, the proposals should take into account the capabilities of an organisation to be changed. Railways organisations are centralised organisation in most of the countries in the world. Attempts of change are on the way in some western countries, some difficulties are encountered, it is somewhere an utopia to define for a short term such an organisation in countries managed for many years in planned economy.

Some specific orientations could be proposed and will be proposed wherever possible. An organisation which could be adapted progressively to a market oriented management will be proposed whenever possible.

Meanwhile, even in a centralised authority, market oriented management with relevant delegation and autonomy in purchase and contract, could be applied.

3.5.2 Traffic forecasts

The outputs of the " Regional Traffic Forecasting Model " are essential for the performance of this project., it could not be afford in our time schedule and our budget to lead traffic forecasts on the freight demand. According to the time schedule of the projects, results are forthcoming for mid June 96, any delays on such inputs will involved the following consequences :

- Irrelevant mobilisation and possibly, waste trips of one of our experts,

- Change on the methodology : assumptions on the fleet should have to be done, and corrections of sizing of the fleet and the facilities should be performed afterwards,

- Therefore, the time schedule and the resources of the project would have to be modified.

3.5.3 Railways infrastructures maintenance

As stated before, outputs of those projects are expecting to assess the operation characteristics of the networks. Outputs are expected for October 96, in case of non significative data are available, at that time, existing characteristics will be considered.

3.5.4 Relationship between the CIS countries

The project team will respect the political and economical relationships between the eight countries involved, it will propose co-operation and synergy as much as possible. It is not in our intention to propose and to present non applicable strategies.

It is understood that the objectives of the TRACECA projects should have to be implemented in a short and medium term period, therefore, no assumptions on long term change could be taken into consideration.

Furthermore, the Caucasus and Central Asia countries are geographically separated, the rolling stock technologies used are different, the maintenance facilities should be different, it could be certainly difficult to define a synergy between the two areas, however, such a synergy will be analysed and synergy inside each o both areas are certainly possible.

During the first surveys carried out, it was also noted a willingness of the Central Asia countries to maintain co-operation with Russia whenever such a co-operation is profitable to both parties, while such co-operation seems to be less relevant between Caucasus countries and Russia.

3.5.5 Knowledge of local industrial capabilities

Local production of spare parts, equipment or vehicles, as well as participation of the private sector in the maintenance activities should be analysed through a very wide range of factories : former military plants, idle industries, efficient factories from other industrial sectors. Such comprehensive survey could not be undertaken within the time schedule and budget allocated for this study. However, a good knowledge of the private and industrial sectors will be necessary in order to give reliable recommendations on private and industrial sectors participation.

Moreover, as a consequence of the planned economy, the competition between all industrial activities was not encouraged, therefore, the industrial activities are very independent and everybody ignores each other, the knowledge of the industrial activities is consequently very difficult and the risks to keep idle one or several branches of the sector is relatively high.

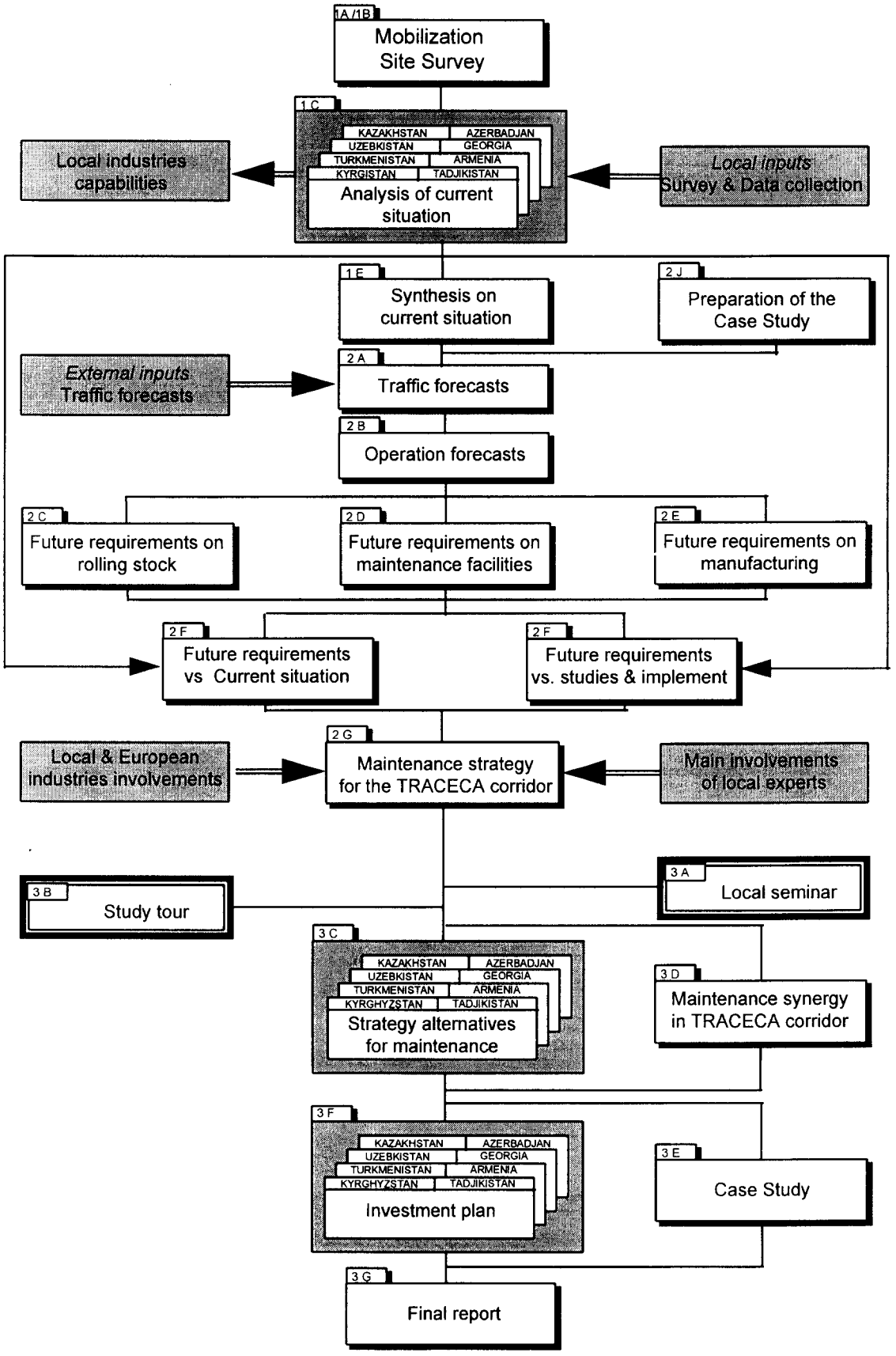
3.6 Planning for next reporting period.

The nest report (" Project progress report ") is due to end of month 6 from the effective date. The activities to be completed at that time differ slightly from the terms of reference. All surveys will be performed in parallel, and analysis for future requirements will also be performed in parallel. Therefore, at the end of month 6, he activities of phase 1 will have been performed, as well as the activities 2 A. and 2 B.

The Project progress report will described :

- Data collected and analysis on the current situation of rolling stock,
- Data collected and analysis on the current situation of maintenance facilities,
- Analysis of the private and industrial sectors,
- Traffic demand should have been evaluate and assumptions on operation should be determined.

3.7 Project organisation chart



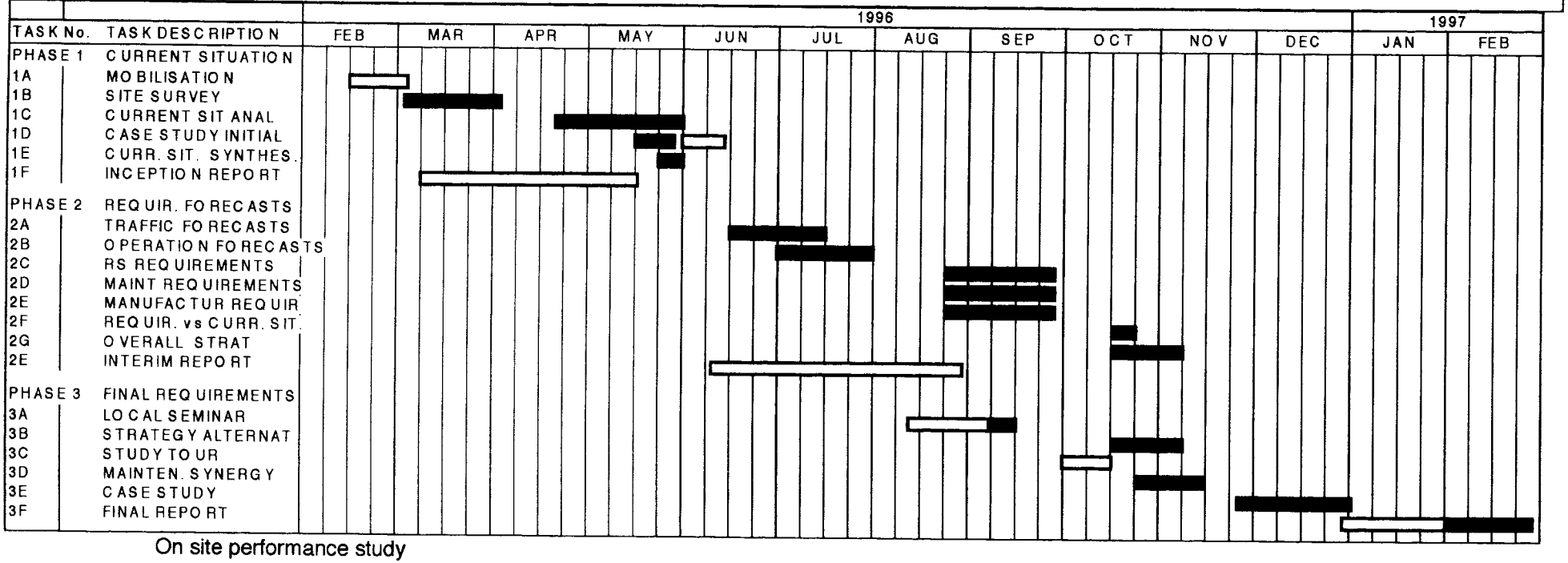
3.8 Overall Plan for operations

Project title :TRACECA / Rolling Stock Maintenance - Railways	Project number : TNREG9309	Countries :ARMENIA, AZERBADJAN, GEORGIA, KAZAKHSTAN, KYRGHYZSTAN, TURKMENISTAN, TADJIKISTAN, UZBEKISTAN	Page :1
Planning period : 06 / 03 / 96 to 06 / 03 / 97	Prepared on :15 / 05 / 96	EC Consultant : SYSTRA SOFRETU SOFRERAIL	
Project objectives :Provide recommendations to solve existing problems in railways rolling stock maintenance			

No	MAIN ACTIVITIES	TIME FRAME												INPUTS			
		1996										1997		PERSONNEL		EQUIPMENT AND MATERIAL	OTHER
		MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	EC Consultant	Counterpart		
1 .	CURRENT SITUATION													9 M x M	10 M x M		
2	REQUIR. FORECASTS													15 M x M	6 M x M		
3	FINAL REQUIR.													8 M x M	4 M x M		
3 A	LOCAL SEMINAR													2 M x M	4 M x M	Conferences	
3 B	STUDY TOUR													1 M x M	8 M x M	Travels to France	
										TOTAL				35 M x M	32 M x M		

3.9 Detailed plan for operations

Project title :TRACECA / Rolling Stock Maintenance - Railways	Project number : TNREG9309	Countries :ARMENIA, AZERBADJAN, GEORGIA, KAZAKHSTAN, KYRGHYZSTAN, TURKMENISTAN, TADJIKISTAN, UZBEKISTAN	Page :1
Planning period : 06 / 03 / 96 to 06 / 03 / 97	Prepared on :15 / 05 / 96	EC Consultant : SYSTRA SOFRETU SOFRERAIL	
Project objectives :Provide recommendations to solve existing problems in railways rolling stock maintenance			



On site performance study

Office performance study

3.10 Overall output performance plan

Project title : TRACECA : Rolling Stock Maintenance - Railways	Project number : TNREG9309	Countries :ARMENIA, AZERBADJAN, GEORGIA, KAZAKHSTAN, KYRGHYZSTAN, TURKMENISTAN, TADJIKISTAN, UZBEKISTAN	Page :
Planning period : 06 / 03 / 1996 to 05 / 03/ 1997	Prepared on : 15 May 1996	EC Consultant : SYSTRA SOFRETU SOFRERAIL	

Outputs (to be described and target dates indicated	Agreed Objective Verifiable Indicators	Constrains and Assumptions C/A
Inception Report : Englisn version 1996 - end week 20 - 17 may Englisn version 1996 - end week 21 - 24 Mai **Project Progress Report** Englisn version 1996 - end week 36 - 6 Sep Englisn version 1996 - end week 38 - 20 Sep **Final Report** Englisn version 1997 - end week 10 - 7 mar Englisn version 1997 - end week 12 - 21 Mar **Local Seminar** 1996 - week 36 - 2 Sep **Study Tour** 1996 - week 40 & 41 - 30 Sep		- Russian translation requires 1 to 2 weeks - Report Agreements of 8 beneficiaries require time and travels or communications - Inputs from other project could delay the project - Specific requests of the beneficiaries could modify the schedule

3.11 Project staffing plan

Project title :TRACECA / Rolling Stock Maintenance - Railways	Project number : TNREG9309	Countries :ARMENIA, AZERBADJAN, GEORGIA, KAZAKHSTAN, KYRGHYZSTAN, TURKMENISTAN, TADJIKISTAN, UZBEKISTAN	Page :1
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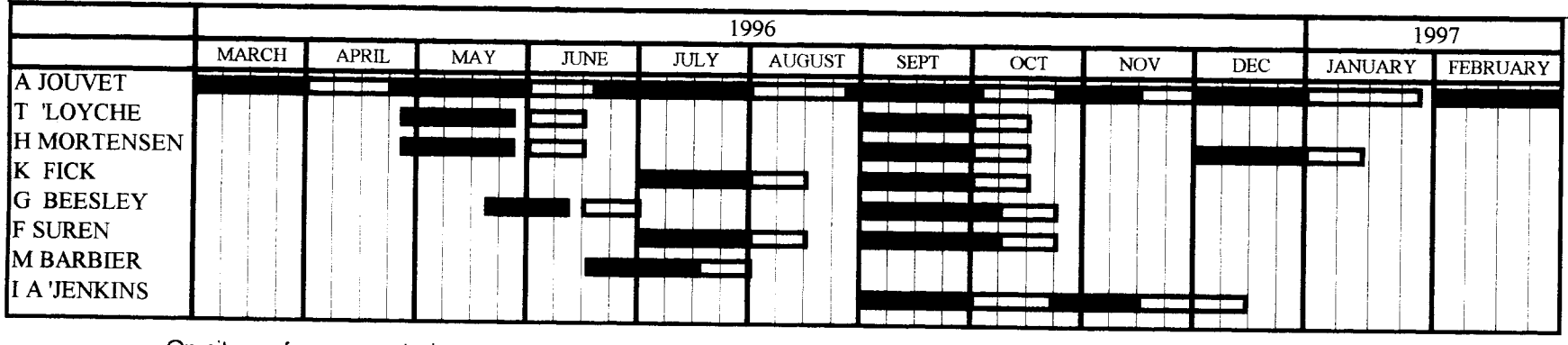
Project objectives :Provide recommendations to solve existing problems in railways rolling stock maintenance			



On site performance study

Office performance study

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