

UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of
Brunei Darussalam, Indonesia, Malaysia,
Philippines, Singapore and Thailand

PROJECT DOCUMENT

T i t l e : CELLULAR RADIO TELEPHONE SYSTEMS APPLICATION

Number : RAS/86/186/A/01/20

Duration : Three years

Primary Function : Direct Support

A.C.C. Programme Classification : Telecommunications (code 0660)

Government Implementing Agency : Telecommunications Administrations of
the ASEAN Group of Countries

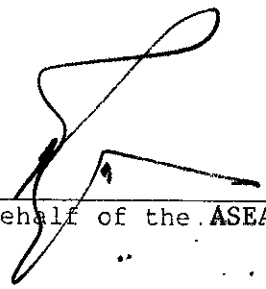
Executing Agency : International Telecommunication Union (I.T.U.)

Estimated Starting Date : April 1987


Government Inputs : In kind

UNDP Inputs : US \$ 500,000

Signed :


On behalf of the ASEAN Governments

Date : 2 OCT 1987


On behalf of the Executing Agency

Date : - 2 APR 1987


On behalf of the United Nations
Development Programme

Date : 2 OCT 1987

PART I

LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in Article 1, Paragraph 1, of the Basic Assistance Agreement between the United Nations Development Programme and the Governments of those participating countries which have signed such agreement. Alternatively, for those participating countries which have not signed such agreement, this Project Document shall be the instrument referred to as a Plan of Operation in Article 1, Paragraph 2, of the Agreement concerning assistance under the Special Fund Sector of the United Nations Development Programme and the Governments of those participating countries which have signed such latter agreement.

PART II

THE PROJECT

A. DEVELOPMENT OBJECTIVES

To investigate the application of Cellular Radio technology to provide economical telecommunications services both fixed and mobile in the countries of the sub-region.

B. IMMEDIATE OBJECTIVES

The Project has the following Immediate Objectives :

1. Investigate the ways in which the Cellular Radio systems of the countries of the subregion might be interconnected into an ASEAN network to provide for transborder mobile telecommunications services.
2. Investigate the potential application of Cellular Radio systems including:
 - a) Investigate the economics of application of Cellular Radio systems to rural telecommunications fixed services.
 - b) Investigate the economics of application of Cellular Radio systems to urban telecommunications fixed services to supplement cable plant systems.
 - c) Investigate the economics of application of Cellular Radio systems to coastal boats and in-land waterways.
3. Develop a facility schedule specification for a digital Cellular Radio system to meet the future requirements of the region.

C. SPECIAL CONSIDERATIONS

Nil.

D. BACKGROUND AND JUSTIFICATION

Cellular Radio system evolved in the developed world to meet the rapidly growing needs for land mobile telephone services in urban areas. The system elegantly conserves the very limited VHF and UHF mobile frequency spectrum and permits a far higher density of users than was previously the case by reusing the allocated frequencies in geographic patterns or "cells".

The ability to stretch the same amount of spectrum to meet the needs of larger numbers of users, together with the high level of demand for fully automatic telephone service in cars, trucks and the like has led to dramatic growth in the provision of Cellular Radio systems in the developed world. This in turn has led to very large production quantities and significantly reduced prices.

While the main demand in the developed world has been for "car" phones, studies in Sweden, the USA and elsewhere are increasingly showing that at present prices in those countries the Cellular Radio systems are able to provide a more economical service to some small density rural areas than are traditional openwire or cable plant.

Similarly some studies have shown that there is an important economic role for Cellular Radio fixed telephone service in urban areas to supplement underground cable reticulated systems.

The service is being sold as an economical alternative for coastal and river pleasure and small commercial craft in lieu of the more expensive maritime radio systems and whilst in the developed world this has most application for pleasure craft, the need in the South East Asia region is for small traditional coastal shipping, and inland waterway commercial craft.

In the ASEAN region Cellular Radio systems are being introduced into the urban areas to meet the demands of the mobile business and commercial sector and the luxury consumer sector. There is an urgent need to conduct in-depth studies of the applicability of these systems to the more pressing needs of rural development, together with the needs of small shipping transport and the large backlog of outstanding fixed telephone service in urban areas. An important economic factor for the ASEAN countries will be to avoid different point to point and point to multipoint radio systems for the different services in each country which in the future will aggravate the problems of spare parts, of maintenance consistency and training. Use of one system to the extent practicable would also be expected to reflect economics of scale in each country.

The USA and the Nordic countries each coordinated their requirements between their states and manufacturers to each arrive at compatible standard systems for their areas. Sadly these standards (Nordic and USA) are not compatible with one another and will not interwork. Europe is currently using at least four different non compatible systems and the penalty for trucks, inland river barges and automobiles transitting borders is either to have multiple systems installed or to lose mobile communications after crossing the border.

Fortunately at least three of the ASEAN countries are using the same system but no attempt has been made to plan the systems for use across borders. The project will investigate the existing systems with a view to the planning of a future ASEAN system.

Finally the countries of the region are all installing digital telecommunications systems and planning ISDN (Integrated Services Digital Network). In this context the existing Cellular Radio systems will be replaced in the next decade or so by digital systems and it becomes important that the scope of facilities needed for the efficient use of Cellular Radio systems is planned and documented to best meet the broad spectrum of ASEAN needs.

E. OUTPUTS

1. A frequency plan suitable for the ASEAN wide operation of cellular radio.
2. Recommendations for an ASEAN cellular radio network and its interconnection with the existing switching networks including pricing and implementation schedule.
3. A study on the applicability of cellular radio to rural and urban fixed services as well as maritime services for small crafts.
4. An agreed charging, tariffs and accounts settlement plan for cellular radio.
5. A study on the requirements in the form of a facility schedule setting out all of the criteria to be met for the ASEAN application of digital cellular radio bearing in mind both fixed and mobile application in a future integrated systems digital network (ISDN).
6. Trained staff:
 - 6 staff members trained through fellowships in charging, tariffs and accounts settlement;
 - 12 staff members trained through fellowships in cellular radio engineering, including planning, installation, maintenance and operation.

F. ACTIVITIES

1. The project will commence with a detailed engineering collation of the existing national Cellular Radio mobile system installations including type, location, coverage, capacity, frequencies and the planned expansion of the systems or planned introduction of systems. The expert will then plan an optimum strategy to establish an ASEAN wide Cellular network on a progressive basis over a planning period consistent with the national expansion needs for Cellular Radio.
2. Consultancy expertise will be provided for three months in the first year to develop a frequency plan suitable for the ASEAN wide operation of a Cellular Radio network.
3. During the second year of the project, after the engineering and frequency planning recommendations have been completed for the ASEAN wide Cellular network a Consultancy of three months will investigate and recommend ways of transborder charging and settlements.
4. The expert will investigate local national cost structures for providing rural telecommunications services and to make cost comparison estimates for a range of different rural telecommunications scenarios.

The exercise is to include some specific typical rural telecommunications locations, but more importantly should establish the comparison model for ready use by the telecommunications authorities in deciding the future applicability of Cellular Radio compared with alternate systems. In particular the expert should consider non Cellular point to multi-point systems in the comparison models.

The exercise will be expected to develop some general guideline conclusions as well as specific examples of rural telecommunications areas of immediate development interest to the administrations.

5. Similarly the project will provide the documented methodology, some specific examples worked, and any general guidelines which can be concluded, for the applicability of Cellular Radio to fixed urban services.

6. Similarly for small craft maritime service.
7. From the results of the work done, and on the basis of likely future cost trends of alternatives the project will review the likely future demand for Cellular Radio systems for different applications. Taking account the various needs of the different applications in traffic density, frequency allocations, service facilities (bearing in mind ISDN) the expert should prepare a facility schedule for the requirements of digital Cellular Radio systems to meet future ISDN needs.

G. INPUTS

Host Country Inputs

The Government of Indonesia has offered to host the project and in view of the small scale staffing requirements of the project - one Chief Technical Adviser and one secretary, - the project will share accommodation and services with the Area Representative Office in Jakarta.

The host Government inputs will therefore include :

1. Office accommodation with normal furniture.
2. Telecommunications services.
3. Normal residential visa and entry/exit facilities together with expeditious visa facilities for senior staff from the Telecommunications Administrations of the participating ASEAN countries to attend meetings in Jakarta.

Participating Government Inputs

1. All participating Governments will appoint one senior officer as the coordinating counterpart for the project.
2. Make available secretarial and other administrative services while the expert is on mission.
3. Provide working access to existing data, to planning information, to working systems in the field, and assist the expert generally in his field missions particularly to rural areas.

UNDP Inputs

- | | | | |
|---|---------------|----------|---------|
| 1. Experts. | Starting Date | Duration | US\$ |
| Chief Technical Adviser/
Senior Expert in Cellular Radio
Systems Planning (Job description in
Annex III) | 1/4/87 | 3 years | 275,400 |
| Short-term Consultants: | | | |
| a) Consultant in Frequency Planning | 1/8/87 | 3 m/m | 22,200 |

The consultant will study the existing frequency allocations in each country and develop a long-term common frequency plan for ASEAN wide use.

b)	Consultant in Tariffs	1/5/88	3 m/m	22,800
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The consultant will develop a charging and tariff system which will be applicable for national and regional traffic.

c)	Consultant in Interfacing	1/6/89	3 m/m	23,400
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The consultant will study and provide advice on the interfacing required to connect cellular radio systems to existing or planned switching networks in each country to meet the various service needs.

2. Administrative Support Personnel

-	Administrative Steno Secretary	1/4/87	3 years	33,400
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3.	Travel			23,000
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4. Training:

a) Fellowships

-	Tariffs, accounting and settlement for cellular radio networks. 6 x 1 m/m (one fellow/country) = 6 m/m	1988/89		9,600
-	Cellular radio engineering (planning, installation, maintenance and operation). 12 x 1 m/m (two fellows/country = 12 m/m)	1988/89		19,200

b) Group Training

One meeting, in the form of a workshop/training seminar of two weeks duration and with two to three participants from each country, is planned each year. The purpose of these meetings is to present and discuss the findings of the CTA/consultants and to arrive at recommendations and agreements for regional interworking of the cellular radio system. Each meeting will cover a whole range of subjects, but will focus on one main subject:

-	Frequency coordination	10/1987		10,000
-	Tariffs, charging and accounting	7/1988		10,000
-	Technical interfaces and timing of implementation	8/1988		10,000

5. Equipment.

1 Micro computer and software	20,000
Office equipment	9,000

6. Miscellaneous.

Postage, telecommunications etc.	12,000
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TOTAL	US \$	500,000
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H. PREPARATION OF WORK PLAN

The Work Plan is set out in broad terms in the schedule of Activities bar chart attached (Annex II). The Chief Technical Adviser will review the schedule after 6 months in post and in close consultation with the countries and after careful consideration of priorities will provide a more detailed revised Schedule of Activities/Work Plan.

I. PREPARATION OF THE FRAMEWORK FOR EFFECTIVE PARTICIPATION OF NATIONAL AND INTERNATIONAL STAFF IN THE PROJECT

The International staff will work directly with the appointed counterpart for each participating country who will in turn be responsible directly to the C.E.O. of each of the participating Telecommunications Authorities. The Chief Technical Adviser will also report to participating Governments through the ASEAN Secretariate COTAC (Committee for Transport and Communications).

J. PRIOR OBLIGATIONS AND PREREQUISITES

1. Host Country - Indonesia.

- 1) The host office facilities are in place. Some minor additions to furniture and telephone service will be required.
- 2) The timely issue of residential permit/visa for international staff.

2. All participating countries.

- 1) The participating countries will nominate national counterparts and will release appropriate staff to work with the Chief Technical Adviser within their own country and to attend working parties as appropriate.
- 2) Temporary office accommodation/work space and administrative support during visits to the country.

3. The I.T.U.

The I.T.U. will make appropriate high level and experienced experts available in timely fashion to undertake the project implementation.

K. FUTURE UNDP ASSISTANCE

The project has at least three aspects viz. 1) interconnecting or networking of telecommunications services, 2) preinvestment planning, and 3) a coordinated look at what is needed for future digital Cellular Radio systems - planning.

It is not possible to predict the need for future UNDP assistance in any of these three aspects but it is possible that further support will be sought arising from the project findings in at least one of the above.

PART III

SCHEDULE OF MONITORING, EVALUATION AND REPORTS

A. TRIPARTITE MONITORING REVIEWS : TECHNICAL REVIEWS

The project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementations.

B. EVALUATION

The project will be subject to evaluation including review through the ASEAN/COTAC meetings and other regional and subregional fora.

C. PROGRESS AND TERMINAL REPORTS

The six monthly progress and terminal reports will be submitted in accordance with the UNDP policies and procedures relating to reports.

PROJECT SCHEDULE - OUTPUTS

OUTPUT	Project Year 1	Project Year 2	Project Year 3	Final Report	Remarks
1) Recommendations for an ASEAN Cellular Radio Network		→	-----	→	Results to be presented and discussed at meeting - end of project year 2.
2) Recommendations on the applicability of Cellular Radio to rural and urban fixed systems and to small craft mobile.		→	-----	→	Results to be presented and discussed at meeting - end of project year 2.
3) Recommended facility schedule for digital Cellular Radio system.			→	→	Results to be presented and discussed at meeting - end of project year 3.

PART IV

PROJECT BUDGET COVERING UNDP CONTRIBUTION
(in US Dollars)

Country : ASEAN Sub-region Countries
 Project Number : RAS/86/
 Title : Cellular Radio Telephone Systems Application

		Total		1987		1988		1989		1990	
		m/m	\$	m/m	\$	m/m	\$	m/m	\$	m/m	\$
10.	PROJECT PERSONNEL										
11	Experts										
11-01	Chief Technical Adviser	36.0	275,400	9.0	66,600	12.0	91,200	12.0	93,600	3.0	24,000
11-02	Consultants	9.0	68,400	3.0	22,200	3.0	22,800	3.0	23,400		
11-99	Sub-Total	45.0	343,800	12.0	88,800	15.0	114,000	15.0	117,000	3.0	24,000
13	Admin. Support Pers.		33,400		7,900		11,000		11,500		3,000
15	Travel		23,000		16,000		3,000		3,000		1,000
19	Component Total	45.0	400,200	12.0	112,700	15.0	128,000	15.0	131,500	3.0	28,000
30	TRAINING										
31	Fellowships	18.0	28,800			10.0	16,000	8.0	12,800		
32	Group Training		30,000		10,000		10,000		10,000		
39	Component Total	18.0	58,800		10,000	10.0	26,000	8.0	22,800		
40	EQUIPMENT										
42	Non-expendable Equipment		29,000		25,000		4,000				
49	Component Total		29,000		25,000		4,000				
50.	MISCELLANEOUS										
51	Miscellaneous		12,000		3,000		4,000		4,000		1,000
59	Component Total		12,000		3,000		4,000		4,000		1,000
99	PROJECT TOTAL		500,000		150,700		162,000		158,300		29,000

Activity	Responsibility	Duration	Project Year 1	Project Year 2	Project Year 3
5. 1) Plan interconnect system. 2) Compute results with field visits as necessary.	(CTA)	9½ months		→	
6. Inspect field and recommend and assist with applications.	(CTA)	6 months			→ → → → → →
7. 1) Develop facility schedule for Digital Cellular Radio. 2) Update computed results.	(CTA)	5 months			→ → → → →
8. Reporting and meeting preparation.	(CTA)	2 weeks/yr 1 week/yr 9 weeks	→ →	→ →	→ →
9. Develop frequency plan for regional working.	Consultant 1	3 months	→		
10. Develop charging/tariff system for regional working.	Consultant 2	3 months		→	
11. Specialist digital expertise on Cellular Radio.	Consultant 3	3 months			→
12. Fellowships.	National Staff	1 month each		→ → 5 staff 5 staff	→ → 4 staff 4 staff

WORK PLAN - PROJECT ACTIVITIES

Activity	Responsibility	Duration	Project Year 1	Project Year 2	Project Year 3
1. Establish office including ordering of equipment. Set up project.	(CTA)	2 months	→		
2. Visit each country and collect data.	(CTA)				
1) Existing systems and coverage		1 month	→		
2) Existing frequency allocations		Thailand			
3) Existing costs for cellular radio system		1 month	→		
4) Existing costs for alternate systems		Malaysia			
5) Local costs		1 month	→		
6) Planned rural telecom expansion		2 weeks	→		
7) Urban telecom demand		Brunei			
8) Small craft telecom demand		1 month	→		
9) Other data as required		Indonesia			
3. 1) Design data base format in project office and establish data base.	(CTA)				
2) Develop computer programme formats.		1 month	→		
		Philippines			
4. 1) Conduct group training meetings.	(CTA)				
2) Arrange fellowship training.		5 months	→ → → → →		
		1 week each year			

JOB DESCRIPTION

Post 11.01

1. Country : ASEAN member countries - Thailand, Malaysia, Singapore, Philippines, Brunei and Indonesia.
2. Nature of Mission : Chief Technical Adviser/Senior Expert in Cellular Radio Systems Planning
3. Duration of Mission : 3 years.
4. Date of Commencement : April 1987
5. Government Organisation to which Expert will be attached : Telecommunications Authorities of the ASEAN nations.
6. Duty Station : Jakarta with extensive travel throughout ASEAN.
7. Duties and Responsibilities :

In collaboration with the Telecommunications Authorities of the region the Chief Technical Adviser will perform the following duties:

 - 1) Investigate the existing Cellular Radio Systems installed in the ASEAN countries.
 - 2) Develop engineering plans for an interconnected ASEAN Cellular Radio network.
 - 3) Investigate the economic application of Cellular Radio techniques for fixed services in rural areas compared with other techniques.
 - 4) Investigate the economic application of Cellular Radio fixed services to supplement cable systems in urban areas.
 - 5) Investigate the economic application of Cellular Radio systems for small craft.
 - 6) Prepare/modify computer analysis programmes for the above work and provide the countries with the programmes. Liaise with Computer Applications Training project.
 - 7) Prepare a facility schedule of requirements of a future digital Cellular Radio system to meet the needs of the ASEAN nations.
 - 8) Supervise the work of specialist consultants and local staff, organise and chair meetings, prepare reports, advise and assist the participating countries across the scope of Cellular Radio systems generally and perform such other duties as may be assigned by the I.T.U.
8. Qualifications and Experience :
 - a) A university degree or diploma with evidence of specialization in telecommunications.
 - b) Extensive use in the planning and application of Cellular Radio Systems in a telecommunications administration. Experience in an international/regional Cellular Radio application (e.g. Nordic network) preferred.
 - c) Experience with the LM Ericsson Cellular Radio system as installed in most ASEAN countries.

2. Administrative Support Personnel
Steno Secretary.

Recruitment of suitable local staff. Readily available.

Reporting and supervision
by Chief Technical Adviser.

3. Travel

An adequate data base collected to process the results and recommendations.

Mission reports.

Annual meeting of countries will identify and criticize any lack of field work.

4. Training

1) Fellowships.

Fellows are placed and return with specific enhanced knowledge and skills.

Reports of fellows.
Reports of Hosts.

1) Telecom Authorities to nominate appropriate fellows. 2) Governments to clear nominated fellows for absence overseas. 3) One or more of appropriate developed countries to offer fellowships.

2) Group Training.

- 1) Meetings are established.
- 2) They operate as technical working parties under the chairmanship of the Project Manager.
- 3) They reach consensus agreement on the appropriate matters.

Record of meetings.

Establishing and agreeing appropriate times and venues for meetings without prejudice to other meeting obligations of senior staff.

5. Equipment

- 1 Microcomputer and suitable software.

- 1) Needs to be in site within 9 months of project commencement.
- 2) Will efficiently compute results from large quantities of input data.

Physical inspection.

No delays in either local purchase procedure or importation.

6. Miscellaneous

The project runs smoothly with prompt ordering, delivery payment of all minor and regular office expenditure.

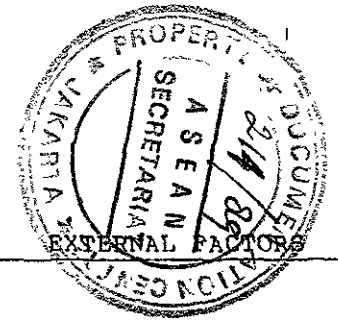
UNDP/I.T.U. procedural records of expenditure.

PROJECT ELEMENTS	SUCCESS CRITERIA	VERIFIERS	EXTERNAL FACTORS
3. A study on the applicability of cellular radio to rural and urban fixed services as well as maritime services for small crafts.	Study undertaken and results disseminated.	Three reports.	"
4. An agreed charging, tariffs and accounts settlement plan for cellular radio.	Plan drafted and distributed.	Documented plan.	"
5. A study on the requirements in the form of a facility schedule setting out all of the criteria to be met for the ASEAN application of digital cellular radio bearing in mind both fixed and mobile application in a future integrated systems digital network (ISDN).	Study carried out and results disseminated.	Report documenting facility schedule.	"
6. Trained staff: - 6 staff members trained through fellowships in charging, tariffs and accounts settlement; - 12 staff members trained through fellowships in cellular radio engineering, including planning, installation, maintenance and operation.	Fellows have acquired specific enhanced knowledge.	Reports of fellows and administrations.	"
<u>Inputs</u>			
1. <u>Experts.</u> 1) Chief Technical Adviser 2) Consultants.	} Assignment of appropriate expert in timely fashion.	Records of Assignment. Area Representative supervision.	---

PROJECT ELEMENTS	SUCCESS CRITERIA	VERIFIERS	EXTERNAL FACTORS
	A recommendation for each country surveying the major urban centres and identifying the extent of economic application of Cellular Radio.		
3) The economics of application of Cellular Radio systems to coastal boats and inland waterways.	A recommendation/report including generalised guidelines for economic application. Plus A recommendation for each country surveying the likely demand/need and application.	Detailed reports to be discussed separately and in full working party with the countries.	Access to the necessary data together with extensive site visits. Delivery of computer and software on time.
3. Develop a facility schedule specification for a digital Cellular Radio system to meet the future requirements of the region.	A report including a recommended facility schedule for a digital Cellular Radio system.	The report issued and discussed in full with the participating countries separately and in meeting.	Dependent on the results of Objectives 1) and 2) to develop facilities plus the non telephone and digital interface requirements of ASEAN countries. Needs consensus in evolving common facility schedule. Will need considerable visiting, communicating and investigating in each country.
<u>Outputs</u>			
1. A frequency plan suitable for the ASEAN wide operation of cellular radio.	Frequency plan fulfilling IFRB and CCIR, as well as the countries' requirements established.	Documented plan.	As set out under External Factors for the Immediate Objectives.
2. Recommendations for an ASEAN cellular radio network and its interconnection with the existing switching networks including pricing and implementation schedule.	Set of recommendations prepared and distributed.	Report documenting recommendations.	"

(1)

BASIC PROJECT ELEMENTS FRAMEWORK



PROJECT ELEMENTS	SUCCESS CRITERIA	VERIFIERS	EXTERNAL FACTORS
<u>Immediate Objectives</u>			
1. Investigate the ways in which the Cellular Radio systems of the countries of the subregion might be interconnected into an ASEAN network to provide for transborder mobile telecommunications services.	A viable plan including physical/coverage planning, frequency planning, tariff planning, engineering interface planning (where necessary) etc. to progressively enable future implementation.	A detailed report to be discussed separately and in full working party meeting with the countries.	Access to all of the necessary Cellular Radio system data both extant and planned in the participating countries.
2. Investigate the potential application of Cellular Radio systems including :			
1) The economics of application of Cellular Radio systems to rural telecommunications fixed services.	A recommendation/report including generalised guidelines for the economic application of Cellular Radio systems for rural telecommunications services in the region. Plus A recommendation for each country surveying the rural telecom development plans and identifying those areas/communities most economically served by Cellular Radio.	Detailed reports to be discussed separately and in full working party with the countries.	Access to the necessary data together with extensive site visits. Delivery of computer and software on time.
2) The economics of application of Cellular Radio systems to urban telecommunications fixed services to supplement cable plant systems.	A recommendation/report including generalised guidelines for economic application of Cellular Radio systems for urban telecommunications services in the region. Plus	Detailed reports to be discussed separately and in full working party with the countries.	Access to the necessary data together with extensive site visits. Delivery of computer and software on time.