Analysys

Effects of Satellite Liberalisation on Corporate and CUG Networks

FINAL REPORT

CONTENTS

0/ Executive Summary

This report examines the role played by terrestrial circuits (or 'tails') in the delivery of satellite services, and identifies how changes in the supply conditions of these circuits would affect the satellite market. It then considers how such changes in the satellite services market might impact on the businesses of the European TOs.

Five satellite service architectures have been considered in this study: one way star data services, interactive star data services, rooftop to rooftop VSAT services, business TV services and broadcast TV uplink. Three of these architectures make significant use of terrestrial leased lines in the delivery of their service: one way star data networks, interactive star data networks, and TV uplinking services. Outline cost models have been developed for each of these cases and it has been found that for typical European satellite networks leased lines constitute on average 5-10% of the total cost of service provision.

Satellite services compete for users in the telecommunications market against terrestrial services offered by the TOs. Users make their choice between satellite and terrestrial services on the basis of five major criteria:

- Is the service fit for the purpose for which it is to be used?
- Is the price of the service appropriate to the utility being sought, and is it competitive?
- Can the service be delivered to meet the required timescale?
- Is the quality of service sufficiently high to meet the requirements of the application and the expectations of the customer?
- Is the supplier of the service perceived as being credible?

These factors influence the user's decision as to whether to purchase a service and which service to purchase. Alterations to the fit of a given service against these criteria will therefore have an impact on market demand.

Price reductions in leased circuits resulting from the ONP Directive on leased lines and from alternative infrastructure liberalisation are likely to provide marginal benefits to satellite service operators and users. The market will also benefit to a degree from enhanced availability and quality of service arising from increased competition within the leased line sector. We believe the most significant positive impact will come from the change in mindset amongst the user base that alternative infrastructure liberalisation will promote. Satellite services and satellite service providers will benefit from increased readiness on the part of users to accept non-TO service offerings: satellite solutions will become more credible and hence more widely adopted.

However, another likely effect of alternative infrastructure liberalisation will be to improve the perceived match between terrestrial leased line alternatives and users needs. Increased competition between terrestrial service providers will reduce prices and enhance the choice and availability of services. These factors will limit the attractiveness of the satellite service as perceived by the user, affecting in particular the market for point to point services, such as IBS and SMS.

We conclude that, on balance, the net impact on the satellite services market of the liberalisation of terrestrial tails for satellite services is likely to be minimal. We also believe that the effect of these measures on EC TOs is likely to be minimal. Change in the size of the satellite services market resulting from liberalisation will be probably be insignificant and certainly less than 10%. As the satellite market constitutes less than 0.3% of total corporate telecoms spend, a worst case scenario for the TOs will be a loss of market share of 0.03%, or ECU 10 million, to satellite service suppliers. A loss of this magnitude will have no significant impact on the TOs' overall business.

1/ Introduction

Analysys is pleased to present to CEC DGXIII this study of the impact of alternative infrastructure liberalisation on satellite services within the European Community.

The objective of the study is to examine the impact of liberalising alternative infrastructure and cable TV networks on the market for satellite services. Such liberalisation will primarily affect the supply (quantity and price) of terrestrial circuits used in the supply of satellite services. It is therefore necessary to identify the relationship between terrestrial circuits and the provision of satellite services; possible changes in the supply conditions of terrestrial circuits; and any repercussions these changes may have for the attractiveness of satellite services to users.

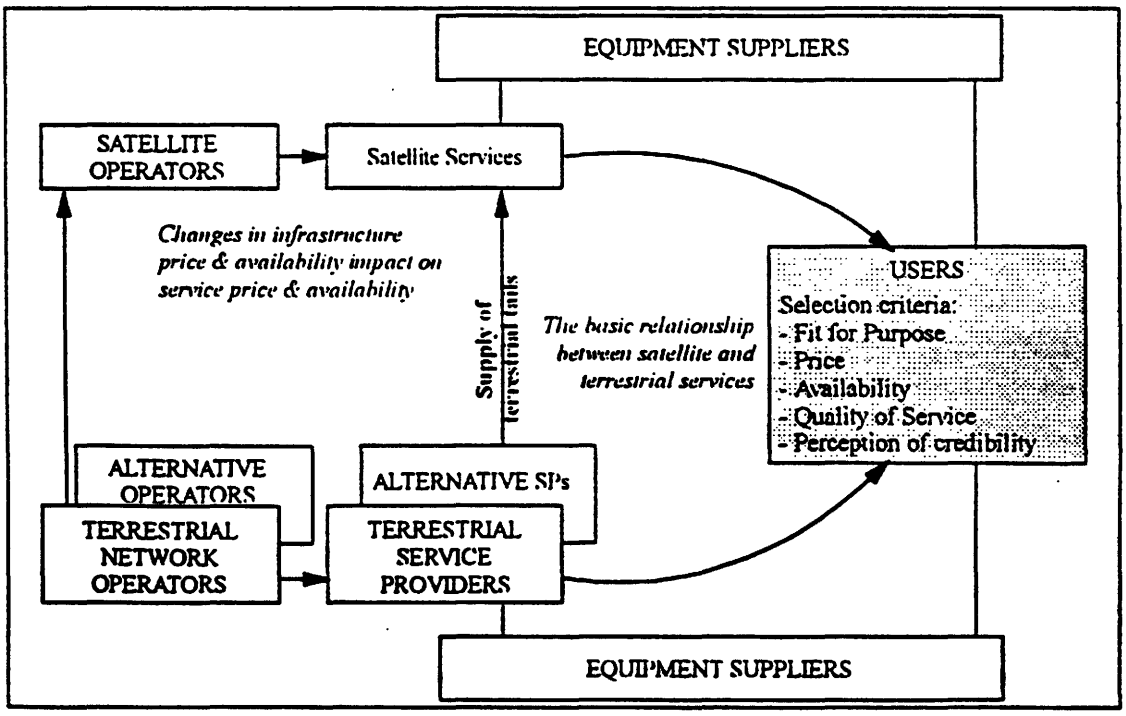
The report is structured as follows:

- Section 2 examines the market for satellite services, identifying the key criteria which influence a user's decision to purchase services in that market.
- Section 3 considers the role that terrestrial leased lines play in the provision of different types of satellite services, and, in particular, their significance in the cost base of these services.
- Section 4 estimates the impact of liberalisation of terrestrial tails for satellite services on two key categories of market player: the satellite service providers themselves, and the EC TOs generally.

2/ Key Drivers in the Market for Satellite Services

Satellite service providers compete for customers in the telecommunications market against terrestrial service providers. Users in this market can choose from a broad selection of services: PSTN, PSDN, leased lines, VPN, one way and two way VSAT services, etc. Some of these services are direct substitutes, while others offer unique characteristics that make them particularly suitable for a specific purpose. In either situation, the user chooses between services judging them against a series of criteria as illustrated in Exhibit 1. These criteria are the key drivers of demand in the market.

EXHIBIT 1: The Dynamics of the Telecoms Services Market



Fit for purpose The service chosen must have transmission characteristics which meet the basic needs of the user. These might include a specific data rate, a requirement for a continuous or periodic connection, a minimum time delay across the link, or conformance to local planning regulations. If a service fails to meet any fundamental requirements in this category, it can be immediately eliminated as a possible option.

Price *Ceteris paribus* price is likely to be deciding factor in a purchasing decision. However, in certain situations price will sometimes be less significant than another factor, such as reliability. Variations between market sectors are discussed below.

Availability of service Any delay in the installation of a service may well influence a user to adopt an alternative solution to his communications requirements.

Quality of service This is perhaps the greatest variable within telecoms service provision, both between service options and between providers, and hence it is the most intense area of competition. Quality of service is taken here to include reliability of supply (measured by mean time to failure and mean time to restoration), delay time over the link, error rates, and quality of after-sales care. The emphasis placed on service quality as a criterion for purchasing decisions depends on both the size of the organisation the buyer represents, and the nature of the application.

Credibility of the supplier A supplier organisation must seem credible to the customer. Few organisations are willing to purchase telecommunications services from a new supplier who is not established in the marketplace.

Obviously the relative importance to the purchaser of these factors varies from case to case. For many large user organisations, credibility of the supplier and quality of service are the most important elements, ahead of availability and price. With large networks to manage and many users dependent on those networks, telecoms managers in large companies prefer suppliers who can offer them a high level of customer support. The more a supplier can offer in terms of service quality, reliability, and a

pedigree to support these claims, the more likely it is to win business. Large user organisations do not like dealing with more than perhaps two suppliers[1] and will pay a premium for quality and security. Nevertheless, if the discount offered by a credible alternative service is significant enough, then that service has to be considered seriously.

Many smaller companies are more price sensitive and hence more receptive to cheaper service alternatives[2]. This category of user will often switch provider for a smaller price incentive than would be the case with a large corporate user.

Any change in the supply conditions of terrestrial circuits will alter the attractiveness of satellite services to these end users, as judged by the above criteria. Some specific effects of liberalising alternative infrastructures are discussed in Section 4.

1 Telecoms User Association Survey, Financial Times, 11/11/93.

2 Analysys research into UK/US/Japanese corporate buying behaviour.

3/ The Role of Terrestrial Circuits in the Provision of Satellite Services

There are five broad categories of satellite service architecture:

- one way star data network
- interactive star data network
- roof-top to roof-top (point to point) VSAT services
- one way business TV network
- TV uplink services

Terrestrial tails play an integral part in the provision of three of these five service categories: one way star VSATs, two way star VSATs, and TV uplinking. The circuits are used to interconnect a customer's premises with the satellite transmitting or receiving terminal, where that terminal is remote from the premises. As such they have an impact on the availability, quality, reliability, and cost of the final offering.

Roof-top to roof-top and business TV services generally do not employ terrestrial circuits. As the term implies, roof-top to roof-top services connect the customer directly to the satellite. There are occasions where one site is connected to a neighbouring site with a terminal using a terrestrial TO supplied circuit, but the circuit is usually short and therefore relatively cheap, and cases in which this occurs are infrequent. This architecture has not therefore been considered in this study.

In business TV networks, 95% of program material is taped before transmission. The tape is then supplied directly to the uplinking site for transmission. In the remaining 5% of cases, short period circuits are installed, usually satellite SNG type connections or microwave links. Changes in the leased line market are not likely to impact directly on the economics or attractiveness of either option.

Identifying the costs of terrestrial circuit provision

Cost models of the three services identified above were developed for typical European service providers[3]. Details of these models are given in Annex A to this report. In general, costs of space segment, remote terminals and terrestrial tails are three of the most significant cost elements in the provision of satellite services. For each model, the proportion of cost attributable to the terrestrial leased circuits was calculated, as shown in Exhibit 2 below.

EXHIBIT 2: Cost Breakdown in Satellite Services

	One way data Service	*Interactive data service*	*TV uplink*
Space segment costs	9%	17%	88%
Remote terminal costs	41%	15%	N/A
Terrestrial tail costs	7%	5%	7%
Other service elements	43%	63%	5%

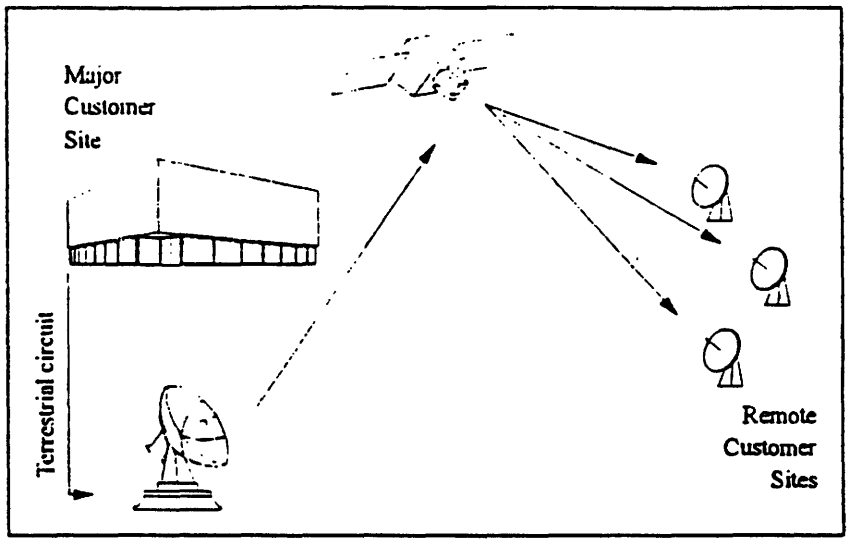
One way star data services

One way data services are typically delivered via a central hub, located within an industrialised region. Whilst large networks may have a dedicated hub located at the customer's headquarters, in most cases costs are minimised by sharing one hub between a number of customers. This usually means that each customer requires a terrestrial circuit to connect the site generating data to the uplink station.

In our model of this network, the service provider is assumed to have approximately 10 customers sharing a hub, each located on average 50km from that uplink station. Each customer has approximately 200 remote terminals sited across Europe. The service data rate in each case is 128kbit/s. Average charges for this service are assumed to be ECU 300 per terminal per month.

3 Three 'typical' service providers have been based on the current state of the market, as reported in Analysys's 'VSAT Monitor'.

EXHIBIT 3:
One way star data services



Data is transmitted to the uplinking station on two 64kbit/s circuits costing ECU 32 000 per annum (Deutsche Telekom rates). Capital costs for installing and commissioning the hub are assumed to be approximately ECU 1 million. Remote terminal costs are typically ECU 3000 per terminal[4]. Capacity on a 36MHz Eutelsat transponder is purchased by the service provider in association with other organisations. It is assumed that he pays for space segment capacity under this system on a pro-rata basis, and that the transponder is 75% utilised.

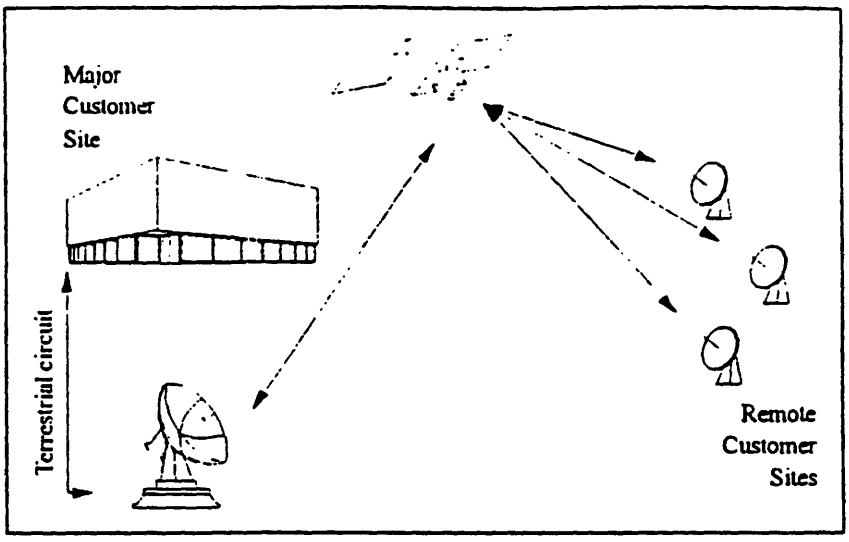
Under these assumptions, the terrestrial circuit accounts for approximately 7% of the total costs. The most expensive element of the network are the receive terminals, accounting for 40% of total costs.

Interactive VSAT services

The interactive network architecture is identical to that of the one way system except that all data paths are bi-directional. The typical service provider in this scenario is assumed to have 4 customers, again located on average 50km from the uplink station. Each customer network is assumed to have 55 remote terminals, served with one outbound link at 128kbit/s and three inbound channels at 64kbit/s. Average charges for this service are estimated at ECU 1500 per terminal per month.

[4] Cost estimates have been sourced from British Aerospace, National Transcommunication Ltd and Maxat.

EXHIBIT 4:
Interactive star data services



Space segment capacity is purchased on the same basis as in the one-way model. The cost of the central hub has increased from ECU 1 million to ECU 2.8 million under the assumption that more extensive monitoring and data processing equipment is required. Terminal costs have also increased, as both transmit and receive capability must be installed. The network is again fed from the main customer site with two 50km 64kbit/s circuits costed at German rates.

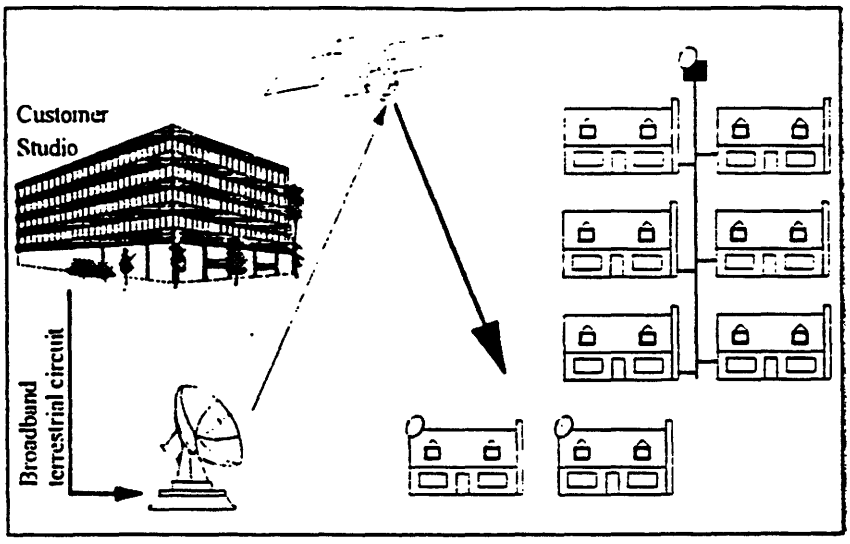
Under these assumptions, the terrestrial circuit accounts for approximately 5% of the total costs. Space segment and terminal costs each account for about 15% of the total.

TV uplink services

This model examines the use of a 30km 34Mbit/s circuit to deliver a TV channel from its originating studio to an uplink station for broadcasting.

Hub costs are similar to the one way data case (ECU 1 million). The cost of the terrestrial circuit increases dramatically (nearly ECU 500 000 per annum), but space segment costs rise even more sharply as a full transponder is now being employed. The net result is that the terrestrial circuit again accounts for only 7% of total costs. Space segment costs are the most expensive factor at nearly 90% of total costs.

EXHIBIT 5: Broadcast TV uplink



From this analysis we conclude that terrestrial circuits comprise only 5-10% of the total cost of provision of a satellite service. As a result of the EC Directive on the application of ONP to leased lines, which requires TOs to move towards a cost orientation, the prices for terrestrial circuits will fall. The rate of fall will be determined by the rate of liberalisation of the sector, the implementation of new technology (such as SDH), and operating efficiency improvements. Analysys has undertaken a number of studies looking at leased circuit prices and concludes that in most EC countries (not the UK), prices could fall by 30%-50%. Such a fall would reduce the total costs of a VSAT service by 2%-5% and would reduce the significance of terrestrial tails to 5% or less of the total costs.

4/ Impact of the Liberalisation of Terrestrial Infrastructure for the Provision of Satellite Services

4.1 Impact on the Satellite Services Market

Having established that terrestrial tails are major elements in the delivery of several types of satellite service, including point to multipoint services, it is possible to examine the impact which liberalisation of alternative terrestrial networks would have on the delivery of such services.

Some idea of the impact of competition on leased lines can be gained by reference to markets where these services are already subject to competition, such as the UK and the USA, where competition has existed for 10 to 15 years. Results have included: reduced cost of provision[5]; shorter waiting time for the installation of circuits; increased variety of services available to the end user; and improved maintenance and repair services (mean time to fault notification, mean time to repair, etc.). We consider below the effect that changes of this type in terrestrial circuit supply conditions might have on the user's buying criteria.

5 UK leased line prices are typically 1/3 those in Germany for 64kbit/s circuits, and 1/5 for 2Mbit/s circuits. US leased line prices are 50% less again.

Fit for purpose

Any impact on the 'fit for purpose' criterion is likely to be negative for point to point satellite services. Users currently choose satellite because of the availability of n x 64kbit/s services, and the more rapid deployment of these services (TO bypass). Point to point satellite services will lose these distinctive characteristics in an environment where terrestrial substitutes are more competitive. Point to multipoint services are likely to be enhanced by the better availability and reduced down time of terrestrial tails.

Price

Reduction in leased line prices will have a marginally positive effect on the attractiveness of point to multipoint satellite services. The discussion in Section 3 illustrates that a 50% reduction in leased line prices will result in a 5% reduction in the price of satellite services. However, the reduction in leased line prices will have a strongly negative impact on the price competitiveness of national and international satellite point to point services.

Availability; Quality of Service

Both availability and quality of satellite services are likely to benefit only marginally from increased availability of the terrestrial tail. As the link is only part of the overall circuit, the increase in quality of service is likely to be limited. In a competitive environment the service provider will have increased leverage on the circuit provider, as he could choose an alternative supplier, a sanction that is not open to him at present. However, there is no evidence to suggest that services are now severely hindered by delays in circuit supply, or poor quality links to the hubs.

Perception of supplier credibility

We believe this is the area where the satellite service provider may gain most. In much of Europe, there is still a reluctance to deal with anyone other than the dominant TO for the supply of communication services. Users are not yet comfortable with the concept of an alternative organisation offering a reliable and long term service. However, in markets where competition has existed for some time, this prejudice has diminished, with users in all sectors recognising that other organisations can offer not only comparable services but often more appropriate and cost effective services. Changed attitudes within the user base will benefit independent suppliers in the satellite services market.

In summary, reductions in the price of terrestrial tails will provide a marginal benefit to satellite service providers in some supply circumstances, such as in the absence of a direct terrestrial substitute. Availability, and quality of service, will be enhanced. Most importantly however, liberalisation of alternative terrestrial infrastructure should help to reduce user prejudices against service offerings from bodies other than the TOs.

However, it is likely that liberalisation of alternative terrestrial infrastructure will improve the perceived match between terrestrial alternatives and users needs. Price competition between terrestrial services will also increase. These two factors will limit the attractiveness of the satellite service as perceived by the user.

4.2 Impact of Liberalisation on EC TOs

The total EC telecommunications services market is worth approximately ECU 77 billion, of which business revenues have been estimated at ECU 41 billion. Satellite services constitute ECU 110 million, ie only 0.3% of business telecommunications services. A detailed examination of the structure of the EC telecommunications market is given in Annex B to this report.

The CEC is concerned about the impact of alternative infrastructure liberalisation on TO revenues and particularly on the corporate network and closed user group (CUG) markets. DGIV has defined these markets[6] as:

Corporate network	'A single organisation encompassing distinct legal entities, such as a company and its subsidiaries or its branches in other Member States incorporated under the relevant domestic company law'.
Government CUG	'Different institutions or services of international and inter-governmental organisations'.
Industry Sector CUG	'A common activity network. In this case, the link between the members of the group is a common business activity (in the broad understanding of the concept). Examples of activities likely to fall into this category are fund transfers for the banking industry, reservation systems for airlines, information transfers between universities involved in a common research project, re-insurance for the insurance industry, inter-library activities, common design projects'.

6 Internal memorandum, DGIV, 1993.

Customer/supplier and Joint Venture CUGs

'An integrated business community or 'business web' encompassing a corporation, partially owned subsidiaries, its employees working outside company premises, major suppliers and customers (for example, qualified users in support of another business objective such as a technical help desk), or dealers'.

Estimates for the size of each of these corporate network and CUG segments are summarised in Exhibit 6. Analysys has sought to distinguish between customer/ supplier CUGs, and joint venture CUGs. Full details of the methodology used are provided in Annex B.

EXHIBIT 6: Total EC Telecoms Spend by User Group

Sector	*Telecoms spend, ECU billions*	*Telecoms Spend, Percentage total Business revenues*
Corporate Networks	13.0	32%
Industry Sector CUG	2.6	6%
Government CUG	0.7	2%
Customer/Supplier CUG	22.0	54%
Joint Venture CUG	0.4	1%
Other revenue sources	2.1	5%

An analysis of the satellite services market shows that customers come primarily from the *corporate network* (eg Banco Comercial Portugues, Elf Aquitaine, William Hill); *government CUG* (eg Italian Social Security); and *industry sector CUG* (eg Reuters, CQG International) segments. These segments have a combined telecoms spend of ECU 16 billion.

The liberalisation of the provision of satellite terrestrial tails could lead directly to a 5% reduction in the cost of point to multipoint satellite services. If the liberalisation of terrestrial infrastructure is allowed only where it is used as part of a satellite service, then this is likely to have a positive impact on the satellite market. This impact will arise both from direct price reductions, and from the improved competitive position of these services in relation to terrestrial circuits. However, the magnitude of the impact will be small since, as we have argued elsewhere, price is not always the dominant factor in the purchasing decision. If full liberalisation of terrestrial infrastructure is permitted, this will significantly reduce the competitiveness of point to point satellite services (such as IBS and SMS), and hence tend to reduce the size of the satellite market.

We conclude that, on balance, the net impact on the EC TOs of liberalising alternative infrastructure under either of the two scenarios described above is likely to be minimal. Certainly, any change in the size of the satellite services market will be less than 10% in either direction. As this market constitutes less than 0.3% of total corporate telecoms spend, a worst case scenario for the TOs will be a loss of market share of 0.03%, or ECU 10 million, to satellite service suppliers. Even if one considers only the market segments where satellite services are traditionally strong, the worst case net impact is a reduction of 0.06%. Losses of this magnitude would have no significant impact on the TOs' overall business.

Annex A/
Cost Models

Note: costs in each of the following models are expressed in ECU.

ONE WAY STAR DATA SERVICES

- Number of customers 10
- Number of terminals per customer 200
- Information data rate 128kbit/s
- Modulation and coding scheme QPSK 1/2 rate FEC
- Occupied bandwidth, including Guardbands 211.2kHz
- Overall transponder occupancy 75%

Notes				*Total monthly revenues*	*Revenues per customer*	*Revenues per terminal*	
1	**Revenues**			600000	60000	300	
		Unit Cost	*Units*	*Cost per month*	*Cost per Customer*	*Cost per Terminal*	*Percentage of total cost*
	Fixed Costs						
2	Hub (incl Network Mgmt)	1000000	1	8333	833	4	2.0%
3	Space Segment	5500000	1	35852	3585	18	8.8%
4	Billing Centre	500000	1	4167	417	2	1.0%
5	Operations Staff (per annum)	30000	10	25000	2500	13	6.1%
	Variable Costs						
6	Terminals	3000	2000	166667	16667	83	40.7%
7	Terrestrial Circuits	32524	10	27103	2710	14	6.6%
8	Sales & Mktg			60000	6000	30	14.6%
9	Maintenance & Repair			30000	3000	15	7.3%
	Working Capital						
10	Stocks			50000	5000	25	12.2%
11	Debtors			7397	740	4	1.8%
12	Creditors			-4932	-493	-2	-1.2%
	Total Costs			409588	40959	205	100.0%
	Operating Margin			46%	46%	46%	

1 Revenue assumptions are based on Analysys estimates.

2 Total cost of RF equipment, (approx 6m) antenna, modems and monitoring/network management equipment. Straight line depreciation over 10 years.

3 ECU 5.5 million is the approximate price of a Eutelsat 36MHz transponder purchased on a non pre-emptible long term lease. One 128kbit/s carrier per customer. Monthly costs to the service provider are calculated assuming the SP pays pro rata for capacity (211.2kHz for each of 10 customers in this case) on a 75% full transponder. In other words, he pays a 33% premium on capacity because the transponder is not full.

4 Total cost of billing hardware, software and maintenance contract. Assume depreciation over 10 years straight line.

5 10 operations staff at ECU 30 000 per person.

6 Typical receiver (eg Comstream @ approx $3k) plus standard 90cm or so antenna and LNB ($500).

7 Assume German 50 km 128kbit/s circuit (or 2*64kbit/s).

8 10% of revenues.

9 5% of costs.

10 Assume 10% p.a. growth in business.
30 days stock = no of customers x no of terminals per customer x 1/12.

11 45 days debtors assuming 10% growth in business.

12 30 days creditors.

TWO WAY STAR DATA SERVICES

- Number of customers 4
- Number of terminals per customer 55
- Outbound Traffic Carrier:
  Information Rate: 128kbit/s, *Number:* 2, *Occupied BW per carrier:* 211kHz
- Inbound Traffic Carrier,
  Information Rate: 64kbit/s, *Number:* 3, *Occupied BW per carrier:* 105kHz
- Modulation and coding scheme QPSK 1/2 rate FEC
- Occupied bandwidth, including Guardbands 526kHz
- Overall transponder occupancy 75%

Notes				*Total monthly revenues*	*Revenues per customer*	*Revenues per terminal*	
1	**Revenues**			330000	82500	1500	
		Unit Cost	*Units*	*Cost per month*	*Cost Per Customer*	*Cost Per Terminal*	*Percentage of total cost*
	Fixed Costs						
2	Hub (incl Network Mgmt)	2850000	1	23750	5938	108	11.6%
3	Space Segment	5500000	1	35716	8929	162	17.5%
4	Billing Centre	750000	1	6250	1563	28	3.1%
5	Operations Staff (per annum)	30000	15	37500	9375	170	18.3%
	Variable Costs						
6	Terminals	5000	220	30556	7639	139	14.9%
7	Terrestrial Circuits	32524	4	10841	2710	49	5.3%
8	Sales & Mtkg			33000	8250	150	16.1%
9	Maintenance & Repair			16500	4125	75	8.1%
	Working Capital						
10	Stocks			9167	2292	42	4.5%
11	Debtors			4068	1017	18	2.0%
12	Creditors			-2712	-678	-12	-1.3%
	Total Costs			204636	51159	930	100.0%
	Operating Margin			61%	61%	61%	

1 Revenue assumptions are based on Analysys estimates.

2 Total cost of RF equipment, (approx 9m) antenna, modems and monitoring/network management equipment. Straight line depreciation over 10 years.

3 Eutelsat 36MHz transponder as in previous case. Inbound and outbound carriers per customer as shown., Assume SP pays pro rata for capacity on a 75% full transponder.

4 Total cost of billing hardware, software and maintenance contract. Depreciation over 10 years straight line.

5 15 operations staff at ECU 30 000 per person

6 1.2m 1Watt Hughes type PES complete with modem.

7 Assume German 50 km 2*64kbit/s circuit (no fractional bit rates offered on national services).

8 10% of revenues.

9 5% of revenues.

10 Assume 10% pa growth in business. 30 days stock = no of customers x no of terminals per customer x.1/12.

11 45 days debtors assuming 10% growth in business.

12 30 days creditors.

TV UPLINKING SERVICES

- Number of customers 1
- Occupied bandwidth, including Guardbands 36MHz
- Overall transponder occupancy 100%

Notes				*Revenues per customer per month*	
1	**Revenues**			540000	
		Unit Cost	*Units*	*Per Customer per month*	*Percentage of total cost*
	Fixed Costs				
2	Hub (incl Network Mgmt)	1000000	1	8333	1.6%
3	Space Segment	5500000	1	458333	87.5%
4	Operations Staff (per annum)	30000	5	12500	2.4%
	Variable Costs				
5	Terrestrial Circuits	458783	1	38232	7.3%
6	Sales & Marketing			4343	0.8%
7	Maintenance & Repair			2172	0.4%
	Total Costs			523914	100.0%
	Operating Margin			3%	

1 Revenue assumptions are based on Analysys estimates.

2 Total cost of RF equipment, (approx 6m) antenna, modems and monitoring/network management equipment. Straight line depreciation over 10 years.

3 Eutelsat 36MHz transponder non pre-emptible long term lease.

4 5 round the clock operations staff at ECU 30 000 per person.

5 Assume German 50 km 128kbit/s circuit (or 2*64kbit/s!)

6 10% of revenues.

7 5% of revenues.

Annex B/
Documentation of a Market Model of EC Telecoms

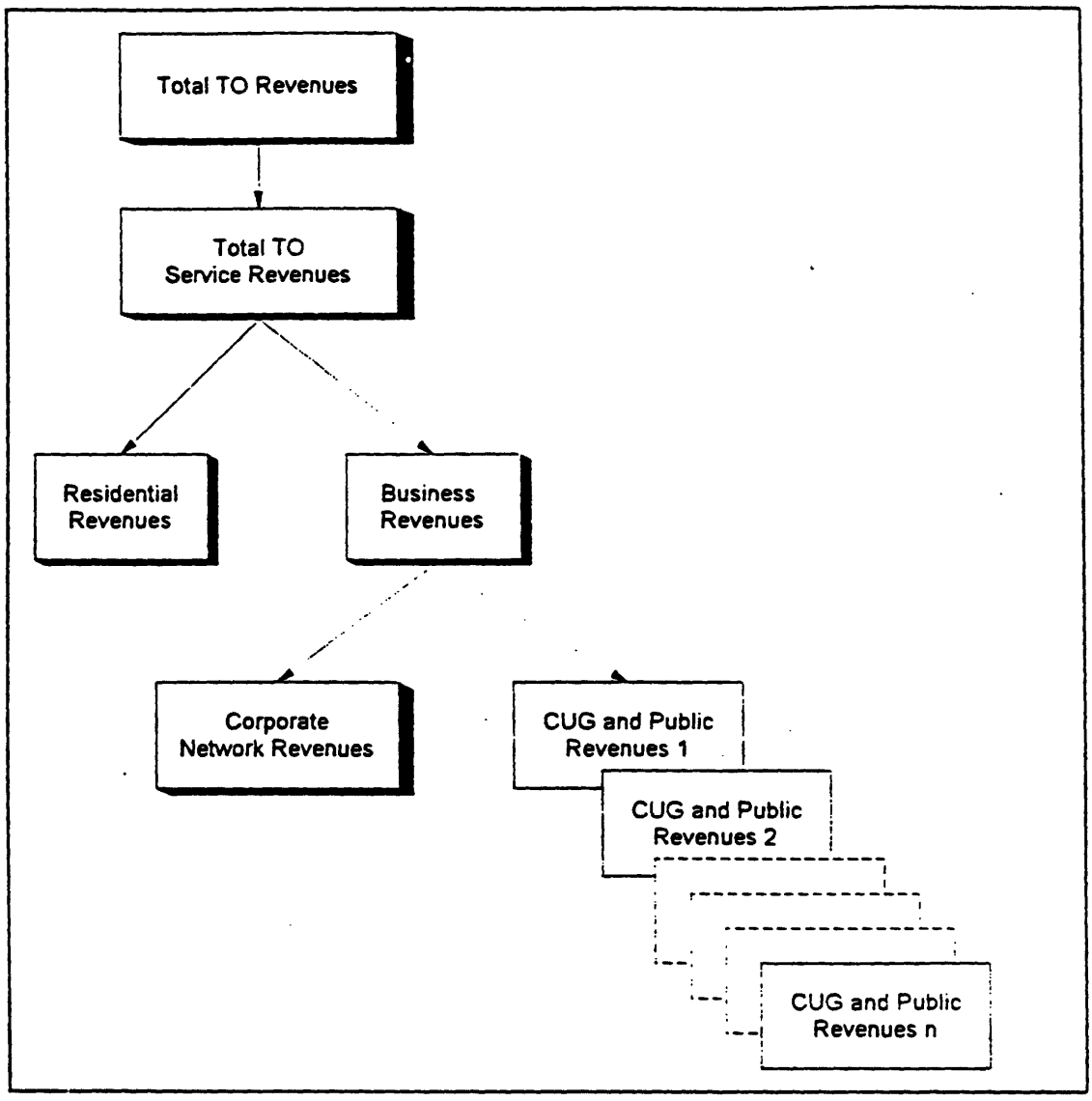
1/ INTRODUCTION

This annex reports on the results of the first task of this study, the development of a model to estimate the size of the telecoms services market in the European Community. Accurate estimates of the size of each service segment are developed, together with methodologies for breaking down the market into constituent parts appropriate to the regulatory policies and framework which the Commission is pursuing. This annex looks in detail at the revenues derived from business customers in order to identify the proportion of these revenues which accrues from 'corporate networks' and from 'closed user groups' (CUGs). The structure of this task is illustrated in Exhibit 1.

The annex is broken down into eight sections:

- After this introduction, Sections 2 and 3 look at total TO revenues from Member States; their breakdown between network service revenues and revenues from other sources; and the split of network service revenues between the constituent services.
- Section 4 looks at the split between residential and business revenues, and breaks this down by service.
- We then look in detail at business telecoms spend (Section 5) and consider how it is broken out between corporate network applications (Section 6), CUG applications and public use (Section 7). A number of methods of splitting CUG and public communications are considered. The resulting differences in market estimates between each method are highlighted.
- Comparisons have been drawn between Analysys's estimates of market size, and those published by CIT research. Section 8 provides a reconciliation between the two approaches.

EXHIBIT 1: Structure of market assessment



2/ TOTAL TELECOMS REVENUES

An estimate for the total revenues earned from telecoms services within the Community in 1991 was established as follows:

- Total reported turnover for each of the dominant TOs in the 12 EC Member States plus Mercury Communications Ltd of the UK[1] were summed.

[1] All revenue data was collected in local currency but has been converted into ECU at the appropriate exchange rate for the year.

- Added to this were estimated revenues accruing to satellite service providers such as Maxsat, Teleport Europe, and Unisource Satellite Services. Other operators such as Kingston Communications, and mobile operators such as Mannesmann and SFR were excluded from consideration.
- Where gaps existed in these figures, data was taken from the ITU[2]. Where values were unobtainable from either source extrapolation from previous years data was used to arrive at estimated figures.

After summing the figures for each operator, the total TO revenues in 1991 amounted to ECU 86.5 billion.

3/ TO Service Revenues

The figure of ECU 86.5 billion for total TO revenues in 1991 includes revenues obtained from non-fixed network services such as the sale of CPE, revenues from cellular mobile and paging subsidiaries, and investment and finance activities. However, because these activities fall outside the scope of this study, it was necessary to estimate revenues from individual fixed network services. These were summed to produce an estimate of total network service revenues within the Community of ECU 77 billion, as illustrated in Exhibit 2 (below). The services included in this figure were PSTN, PSDN, ISDN, telex, telegram, leased lines, VPN, and satellite services. The figures were compiled from data in annual reports where available, and other industry sources such as ITU.

EXHIBIT 2: Total EC Network Service Revenues (1991)

Service	*Revenues (ECU millions)*
PSTN	67990
PSDN	3314
Leased line	5640
VPN	220
Satellite	110
TOTAL	77274

[2] ITU source details.

PSTN Revenues

PSTN revenues were quoted separately by seven out of the twelve TOs in Europe. However, because definitions in annual accounts can vary, ITU data was used for consistency. In all cases, ITU data was compared with TO annual accounts data. Where differences existed between 'telephony' figures in annual accounts and ITU figures, these were insignificant. PSTN revenues within the EC in 1991 were estimated at ECU 68 billion or 88% of total network revenues.

Leased Line Revenues

Revenues from leased line services were quoted in the annual reports of seven operators. Figures for the other operators were estimated by applying the European average ratio of leased lines to network service revenues, and then modifying that ratio taking into consideration estimates from other industry sources. By this method, leased line revenues were estimated at ECU 5.6 billion in 1991, accounting for 7.3% of total network revenues. In comparison, the US market stands at about $7 billion, or around 6% of the total market (however the volume of circuits in the US is several times that in Europe).

PSDN Revenues

The PSDN figures were derived by summing PSDN, ISDN[3], telex and telegram figures obtained directly from annual reports (where they were separately identified) or by using ITU data. Again, the resulting data was checked against other industry estimates from organisations such as Data Strategies and CIT. Total PSDN revenues for 1991 were estimated at ECU 3.3 billion, 4.3% of network revenues.

VPN revenues

Very little data is currently available for VPN revenues in Europe. Indeed, in 1991, few if any VPN or outsourcing contracts had been signed. The size of the VPN market was therefore estimated, based on the assumption that VPN is offered initially as a private network replacement, and in particular a replacement for heavy expenditure on large leased lines carrying voice traffic. The UK is currently estimated to account for 80% by

3. It is probably reasonable to assume most ISDN traffic is still data. But as the market grows this assumption will become increasingly erroneous when ISDN will be considered a stand alone public network service.

volume and 60%[4] by revenue of the 2Mbit/s leased line market in the EC. Organisations with 2Mbit/s leased circuits will have the strongest incentive to purchase VPN, since they have a high expenditure on leased lines, are the organisations that offer the greatest economies of scale to the TOs, and will already have the basic rate of access presently required for access to VPN services. In an earlier study Analysys estimated that the size of the UK VPN market is currently worth approximately £100 million. Scaling this figure up using the above methodology gave a 1993 estimate for Europe of ECU 220 million.

Business Satellite Service Revenues

Total business satellite service revenues in the EC were estimated at ECU 110 million in 1991, that figure being obtained through two routes.

The first considered revenues reported by TOs in annual reports, and estimates of TO revenues from other industry sources. This gave a figure of ECU 72 million for 1991. However, this included revenues from broadcast services (eg commission from leasing Eutelsat transponders for broadcast purposes, and uplinking TV channels to Eutelsat and Astra), which were not part of the market under consideration. Moreover, the figure excluded revenues from other independent business service providers such as Maxat, Teleport Europe, and Polycom.

The second approach used available data on installed terminals from Comsys and Analysys, combined with Analysys estimates of average revenue per terminal. A total of approximately 8000 one way data terminals, 1800 two way data terminals, and 16000 business TVRO terminals were installed in the Community in 1991. Average revenues per terminal were assumed to be ECU 200, ECU 1500 and ECU 300 per month respectively[5] and by multiplying this up, a figure of ECU 110 million was reached for total revenues.

This figure was cross-checked with the data available from TOs. The Comsys/Analysys data suggested that 44% of one way terminals, and 66% of interactive terminals were

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[4] Analysys estimates that in 1991 continental TOs obtained over 2.5 times the revenue per 2Mbit/s circuits than the UK. Eurodata suggests that TO tariffs in Germany were approximately 6 times greater than in the UK, while in France they was twice as large. For these reasons, we estimate that the UK's share of market revenues is lower than its share of circuits installed. However, variations in tariff structures and customer utilisation patterns make accurate estimatation very difficult.

[5] Revenues are assumed to be for equipment rental/leasing, and transmission capacity only. No additional value added service element is included in this figure. As an illustration, we exclude any charges that would be made for the following services: programme making activities in the services offered by SIS, business TV networks, or SNG; information added to a data network service; any management element added to a network service other than for the maintenance and monitoring of the transmission channel.

provided by TOs. Under the above pricing assumptions, the estimated revenue share of these segments to TOs was 58%. Applying this across to the whole market produced a total market size of ECU 125 million. However, this included revenues accruing to the TOs from broadcast services and, bearing this in mind, a figure of ECU 110 million seemed again to be a reasonable estimate.

4/ METHODOLOGY FOR CATEGORISING BUSINESS AND RESIDENTIAL EXPENDITURE

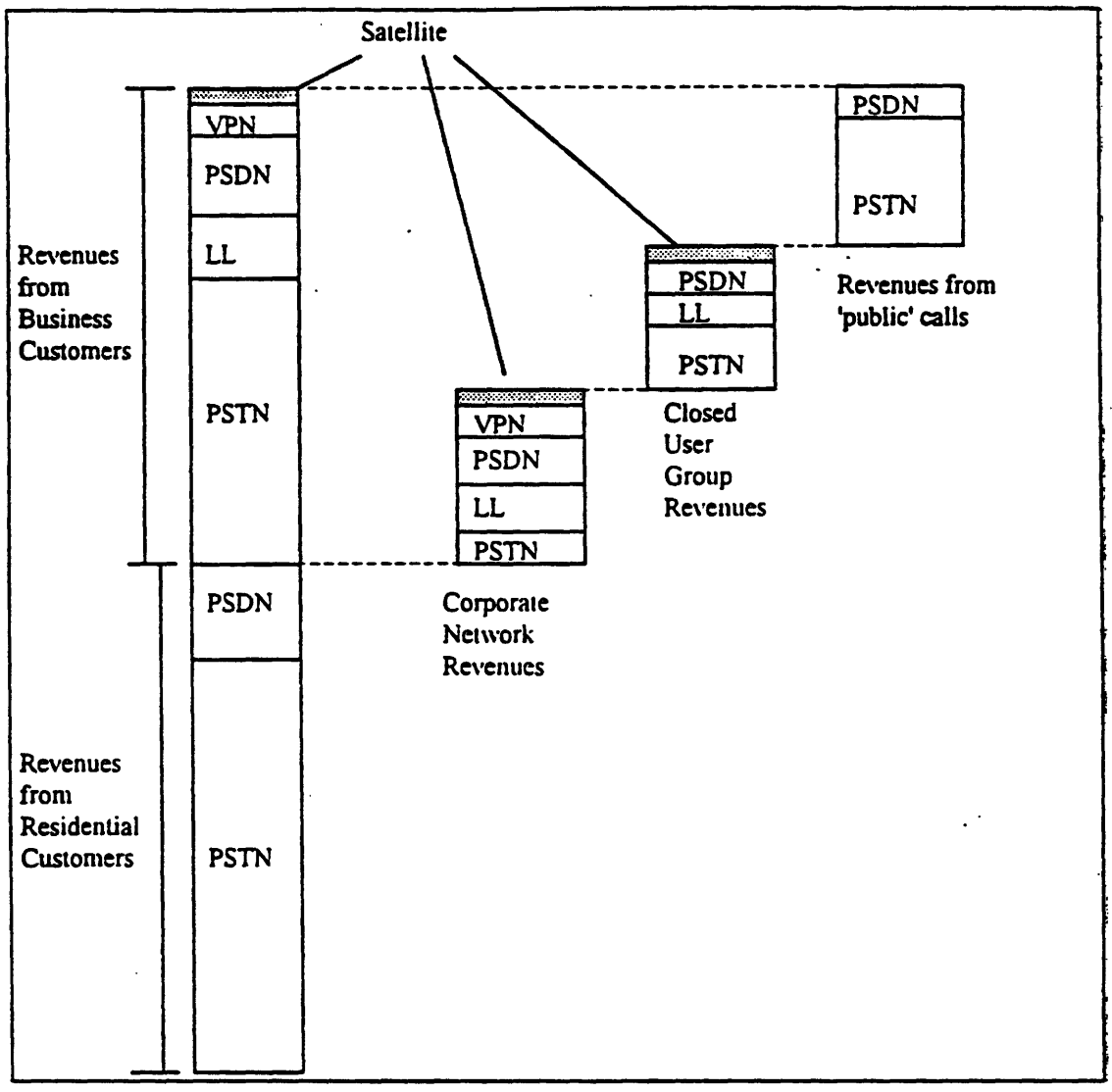
Having established total TO revenues by service, a model to categorise this expenditure between different customer groupings was then developed, as illustrated in Exhibit 3 opposite. The first sub-division applied was between revenues derived from business users, and revenues derived from residential users. The source of business revenues was then examined more closely, in order to estimate the value of traffic (i) arising through intra-corporate communications (corporate networks); (ii) arising from closed user group communications; and (iii) arising from 'public communications'. The definition of each of these categories is the subject of much debate, and particular attention was paid to how varying the definition of CUG communications altered the distribution of sourced revenues.

Business and Residential Split

The split between residential and business revenues was estimated on a service by service basis. It was assumed that residential users subscribe only to PSTN and PSDN services.

The PSTN distribution between business and residential markets is not published by TOs in any annual reports. In a previous study for the CEC, Analysys estimated this split for each Member State in 1990 and a ratio of business to residential revenues of 47:53 was obtained for the Community as a whole. The individual country ratios which had made up this overall split were compared to other published estimates. The overall split was now applied to the 1991 PSTN totals, since there was no reason to believe that the ratio had changed significantly between 1990 and 1991, producing a figure for total business PSTN revenues of ECU 31661 million and for total residential PSTN revenues of ECU 36329 million.

EXHIBIT 3: Model of the EC Telecoms Market



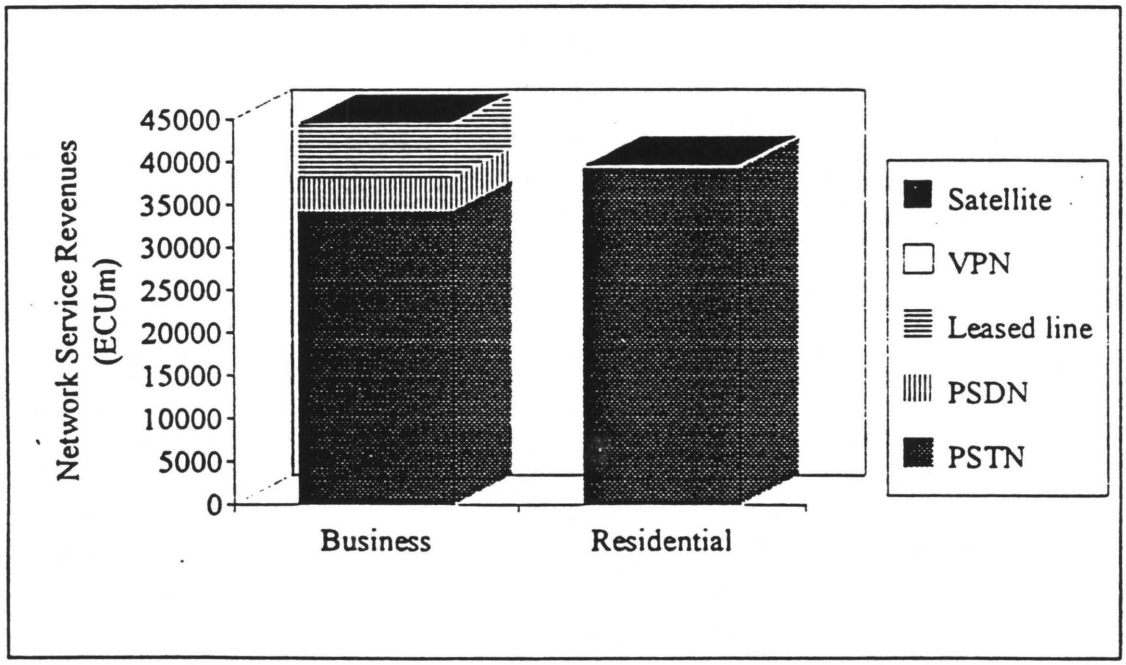
In addition to the PSTN service, it was assumed that residential users contribute in small measure to PSDN revenues, by accessing X.25 networks and services such as Minitel, BTX, Compulink, Prestel, and other European public data systems. An estimated 5% (ECU 103 million) of total PSDN revenues are sourced from residential users, but it is unlikely that residential subscribers make significant use of any of the other services considered.

Total residential revenues therefore amounted to ECU 36.4 billion for 1991. By inference, corporate subscribers contributed ECU 40.8 billion to the TOs and satellite service providers. Exhibit 4 outlines the breakdown of each category of subscriber by service, and Exhibit 5 graphically illustrates this distribution.

EXHIBIT 4: EC Business and Residential Network Service Revenues (1991)

	Business ECU millions	*Residential ECU millions*	*Business*	*Residennal*
PSTN	31661	36329	47%	53%
PSDN	3211	103	95%	5%
Leased line	5640	0	100%	0%
VPN	220	0	100%	0%
Satellite	110	0	100%	0%
Total	40842	36432		

EXHIBIT 5: Business and Residential Network Service Revenues for EC (1991)



5/ REVENUES FROM BUSINESS SUBSCRIBERS

Revenues from businesses can broken down into three classes – corporate network revenues, revenues from Closed User Groups, and revenues from 'public' services – broadly defined as follows:

- Corporate Network revenues: those revenues accruing from communications between sites of the same company
- Closed User Group revenues: those revenues accruing from communications between users with some form of close business association
- Public traffic: revenues accruing from all other communications.

These definitions are, however, too imprecise to be useful in defining and regulating the competitive environment within the Community. It is possible to interpret them in an extremely restrictive sense, such that meaningful competition is impossible to achieve. However, a much broader interpretation is also possible, which would completely open up the corporate communications market to competition. In the following sections, the above definitions are refined in order to segment this market in greater detail.

6/ CORPORATE NETWORK SERVICES

6.1 Definition of Corporate Networks

Corporate, or private, communications services were defined in this study as those services used exclusively for communications within an organisation i.e. intra-organisation communications. This definition included both

- communications between sites belonging to the same company such as between each site in a retail chain; and
- communications between the sites of separate companies which are owned or controlled by a common organisation

irrespective of their geographical location. Communications services used to provide intra-corporate communications include the public switched telephone network, terrestrial leased lines, private and public switched data networks, private satellite circuits and networks, and Virtual Private Networks.

Eurostat estimates that 10.6 million out of the 11.6 million companies they have identified in the Community employ fewer than 10 people. The vast majority of these will be single site organisations, therefore a consideration of corporate network traffic should focus primarily on large and medium-sized organisations.

The key point to note in the definition given above is that both public *and* private communications services are used to provide intra-corporate communications. In the UK, traffic of this nature carried over the public network is generated either by

companies which are too small to take economic advantage of private leased lines or by large companies whose private facilities carry only a part of their inter-site traffic. Large companies need to manage use of capacity effectively, i.e. using PSTN or PSDN during the busy hour when the private networks would otherwise become congested. This is more economical than leasing generally under-utilised private lines.

In mainland Europe, different tariff structures for leased lines make them uneconomic for all but the largest organisations. In these cases, the majority of private circuits are used for data only, with the PSTN being used almost exclusively for voice traffic (including intra-corporate voice traffic).

6.2 Estimate of the Corporate Network Market

Our basic hypothesis was that the level of intra-corporate communications is driven primarily by the number of sites a company occupies and by the nature of its business, rather than by the services to which it subscribes (eg proportion of leased line traffic to PSTN traffic). To test this hypothesis exhaustively, it would be necessary to understand the distribution of industrial sites by sector in each Member State, and to undertake a comprehensive survey of calling patterns within each sector of each country, a task beyond the scope of this study. However, company and site data was collected and collated.

After consulting a number of sources[6], it was found that information on the distribution of the average number of sites per company was available only in Germany, and then only on an aggregated sector basis. (All other sources provided establishment, employment and enterprise data in irreconcilable formats.)

In the absence of necessary information, two different methodologies were therefore adopted to estimate the size of the market. The first method derived corporate network expenditure from a UK industry survey, and then applied the results to the remainder of the Community. The other examined telecoms spend sector by sector across the Community to estimate the proportion of calls made to sites within a corporation. This second method was also used in the definition and estimation of CUG revenues.

[6] Sources consulted were Eurostat, ETCO, Scicon study for the CEC, the Central Statistical Office, the Institute National de la Statistique et des etudes Economiques, Federal Statistical Office (Germany), Department of Employment (UK), Euromonitor.

Method 1: Use of UK Survey Data Applied to the EC as a Whole

The limited survey data available for the UK was used to estimate the total percentage of corporate revenues accruing from total intra-corporate communications. The survey produced the following data for the breakdown of business telecoms expenditure amongst the sample population of large and medium sized companies.

EXHIBIT 6: Business Telecoms Expenditure by Service

Size	*Turnover in ECU millions*	*Percentage of total telecoms spend:*		
		PSTN	*Leased lines*	*Other*[7]
Large	> 130	50%	45%	5%
Medium	13 to 130	75%	25%	0%
Small	< 13	100%	0%	0%

'Large' organisations generally have a large number of sizeable sites, leading to a high density of leased lines, and a high level of intra-organisational communications. Exhibit 6 illustrates that 45% of telecoms expenditure for the 'large' category was on leased lines. On the assumption that this represents 75% of total intra-organisational traffic for these large organisations, an estimated 60% of their total telecoms expenditure was on intra-organisation communications. This figure seems reasonable when compared to those generally quoted by telecoms managers of large multi-nationals for corporate communications (around 50%).

Medium-sized organisations have, on average, fewer sites per organisation and each site is, on average, be smaller. Consequently, the density of both leased lines, and intra organisational traffic will be lower. It was assumed that leased-line expenditure only accounts for 60% of intra-organisation traffic in these organisations. Applying the figure for leased line expenditure in Exhibit 6 produced an estimate of 40% of total telecoms spend.

The survey data also confirmed that the small companies category had zero expenditure on leased lines. Since the vast majority of small companies are single site organisations, it was estimated that only 1% of communications expenditure in this category was on intra-organisational traffic.

[7] Includes VPN

Data from BT illustrates the distribution of telecoms expenditure amongst these three company size categories, as shown in Exhibit 7. It was assumed that, to a first approximation, the size categories in Exhibits 6 and 7 are the same.

EXHIBIT 7: Telecoms Expenditure by Organisational Size

Size	*Number of lines per company*	*Percentage of total business revenues*
Large	>21	24%
Medium	6 to 20	42%
Small	1 to 6	34%

Combining these two sets of data allowed the calculation of intra-corporate revenues as a percentage of total business telecoms spend. For example, large companies spend 60% of 24%, ie 14% of total revenues on intra-corporate communications. These two sets of results, breakdown of intra-corporate revenues by service, and as a percentage of the total market, are summarised in Exhibit 8 below.

EXHIBIT 8: UK intra-corporate communications

Size	*Intra-corporate communications as a percentage of company's telecoms spend*	*Breakdown of intra-corporate revenues (1) % PSTN*	*Breakdown of intra-corporate revenues (2) % Leased line*	*Intra-corporate revenues as a percentage of total business market*
Large	60%	25%	75%	14%
Medium	40%	40%	60%	17%
Small	1%	100%	0%	0.3%

In the UK, leased lines are extensively used by large and medium sized organisations for both voice and data. As noted above, this is different to the case in most of the rest of the Europe, where PSTN is used almost exclusively for voice, and PSDN[8] is used for data. However, if the distribution of sites per company per sector is similar, and prices as measured by a basket of representative services are similar, then the overall expenditure on intra-corporate communications should be broadly the same.

[8] The majority of low rate leased lines in continental Europe are installed to provide direct access to the PSDN.

As discussed above it was not possible to confirm that the distribution of sites is the same across all Member States. However, it was established that business service prices in France and Germany, as measured by the Oftel basket, were within 10% of those in the UK. In Italy prices were 20% higher than both the UK and Germany. This implies that although the services used are different, corporations across the Community spend broadly the same to transfer a given volume of traffic from one site to the other.

UK estimates were then applied to the EC market as a whole. Summing intra-corporate revenues for large, medium, and small companies (Exhibit 8) gave an estimate of approximately 32% of total business telecoms spend, an EC total of ECU 13 billion.

Method 2: Sector Analysis

Intra-corporate expenditure was estimated on a sector by sector basis using the NACE categorisation system. For each sector, the ratio of internal calls going off-site vs those remaining on-site, and the ratio of external calls made to internal calls, were considered. To arrive at these estimates a model was developed, based on the typical numbers of sites per company in each sector, and on the nature of the business activity, especially the level of contact with customers and suppliers. Sector estimates of intra-corporate spend as a percentage of total telecoms spend were then produced, and the sector spend on telecoms was multiplied by this figure to arrive at a total intra-organisation spend figure, as is illustrated in Exhibit 9.

By this method it was concluded that approximately 35% of total business telecoms spend is intra-corporate, with a value of ECU 14 billion. This figure is similar to that derived using Method 1.

Conclusions

From the above methods, we conclude that expenditure on corporate networks accounts for approximately one third of all business expenditure on telecoms services. This equates to approximately ECU 13 billion per annum. It must be emphasised that both of these methods rely to a large degree on judgement based on personal experience, and as such they provide good general indicators of the level of spend in this category, rather than accurate estimates.

EXHIBIT 9: Sector spend and intra-corporate spend

Sector	*Telecoms service spend, ECU billions*	*Intra-corporate spend as % of total*	*Intra-corporate spend, ECU billions*
Energy and water	0.7	26%	0.2
Mining and chemical industry	1.5	26%	0.4
Metal manufacture, electrical engineering	2.1	26%	0.5
Other manufacturing	1.9	26%	0.5
Building and civil engineering	0.8	15%	0.1
Distributive trades, hotels, catering, repairs	10.3	35%	3.6
Transport and communication	3.3	33%	1.1
Finance and business services	12.9	38%	4.9
Other services, incl. government	7.1	43%	3.0
Total ECU	**40.6**	**35%**	**14.3**

7/ CLOSED USER GROUP SERVICES

7.1 Definitions of Closed User Groups

Closed user group (CUG) services are used solely for communication between entities with an existing commercial or professional relationship, who make an explicit agreement to use a network or networks for the provision of communication services between their respective organisations. Communications typically take place within vertical or horizontal market segments.

The definition of who may participate in a closed user group (CUG) is obviously crucial to the process of determining the impact of CUG networks on European telecoms. The problem is to devise a definition which allows organisations with common business interests, according to the spirit of the definition, to form CUGs. It is equally important that those organisations with no common interests, according to the spirit of the definition, should be prevented from forming CUGs.

Two critical questions will determine the size, and therefore the impact, of the CUG market:

- How easy is it to join the CUG ?
- What regulatory body should decide who can join?

One way of defining the CUG is to specify what it should exclude, but this is a long and invariably incomplete process. It seems likely that this approach would lead to a broad definition of CUGs, and they would consequently be relatively easy to form. For example, a minimum level of exclusion would only cover ad-hoc communications between entirely independent entities, and personal calls made by employees, etc.

However, the converse is also true: by drawing up an explicit list of who can form CUGs, the definition will become very restrictive, and will act as a disincentive to forming such a network. Indeed, the creation and operation of an approval body (in the form of a CEC organisation, a national regulatory authority, or a series of industry sector-specific organisations) is likely to severely restrict take-up, even amongst those entitled to form CUGs.

Setting up a single EC-wide approval body would lead to a high degree of consistency in applying the definition, but such a body is also likely to be perceived as both remote and slow. NRAs would probably have a faster response time, but consistency between Member States would be difficult to achieve, as would co-ordination between approval authorities for multi-national networks. Industry associations would also offer speedy response and pan-European co-ordination. However, they would have problems with co-ordinating cross sector networks, should they be permitted. In short, there is no ideal solution.

DGIV has proposed the following definitions of corporate networks and closed user groups:

Corporate network	'A single organisation encompassing distinct legal entities, such as a company and its subsidiaries or its branches in other Member States incorporated under the relevant domestic company law'.
Government CUG	'Different institutions or services of international and inter-governmental organisations'.

Industry Sector CUG	'A common activity network. In this case, the link between the members of the group is a common business activity (in the broad understanding of the concept). Examples of activities likely to fall into this category are fund transfers for the banking industry, reservation systems for airlines, information transfers between universities involved in a common research project, re-insurance for the insurance industry, inter-library activities, common design projects'.
Customer/supplier and Joint Venture CUGs	'An integrated business community or 'business web' encompassing a corporation, partially owned subsidiaries, its employees working outside company premises, major suppliers and customers (for example, qualified users in support of another business objective such as a technical help desk), or dealers'.

In the following paragraphs, we expand and elaborate on these definitions, giving examples of each type of CUG, and discuss potential difficulties arising from the definitions.

Joint Venture Networks

Under this definition, communication between organisations involved in a contractual joint venture is defined as being within the same closed user group.

Example: Could include the Airbus consortium involving British Aerospace, Aerospatiale, DASA and CASA. However, even with this apparently simple definition, problems exist. GEC-Alsthom could interconnect with both GEC and Alcatel. Would GEC and Alcatel then be members of the same CUG because of their joint venture? Could an independent service provider offer to service the communications needs of all three organisations together? Given FIAT's extensive involvement with much of Italian industry, could it set up a CUG covering almost every corporation in Italy?

Same Industry Sector

Under this definition, communication between organisations defined as being within a single industry sector could set up a CUG. Membership of a given sector would be determined either by industry categorisation (probably NACE) or by membership of an industry association. Depending on the size of the CUG segment which is considered acceptable, NACE codes could be used, to one, two, three, or even four digits.

Examples: SITA provides networks for the travel industry worldwide. This network links airlines and travel agents and allows worldwide booking of airline tickets. SWIFT

provides networks to the banking world which allows rapid and secure financial transactions. Both SWIFT and SITA only provide network services to organisations within their own industry sector and could therefore constitute an acceptable CUG.

However, this definition could prevent the formation of common user groups between suppliers and their customers. One major category of potential users which would be excluded under this definition is manufacturers seeking to implement Just-in-Time manufacturing strategies.

Communication with Government Institutions

Under this definition, communication between government institutions or between any organisation and a government institution is defined to be within a Closed User Group. Here, government institutions are defined to include all institutions of European, national and local government.

Examples: Applications that would be allowed within this category include: electronic access to the Official Journal of the EC and other CEC databases; access to procurement information from national and local government; communication with taxation authorities; access to public libraries; communication between large engineering companies and the ministries (e.g. Defence) with whom they have contracts.

This is an excellent example of a very restrictive definition, where it is easier to list those organisations and applications included than those excluded.

Business relationship

Under this definition, communication between organisations with any type of business relationship is defined to be within a CUG. This could include franchisers and franchisees, partners in a large project for a single customer, or organisations involved in the same market value chain. It may be possible to limit the CUG to an entity's five largest suppliers and customers (by traffic volume or by value). In practice many new infrastructure suppliers will only find it economic to supply links which carry a certain minimum volume of traffic.

Examples: This broad definition suggests many examples for CUG development. All of the examples quoted in the previous scenarios would be valid under this definition,

together with others such as: EDI systems for Just-in-Time Manufacture (eg Renault) where reliable and frequent communications are required between supplier and customer; EDI systems for supermarket ordering; EFTPOS and credit card clearance systems allowing connection of retail outlets to financial services organisation (eg Visa); medical information networks; networks connecting lawyers and estate agents in a single system; networks connecting delivery firms and their customers.

In the case of value chain networks, it may be possible to exclude the final customer from the Closed User Group on the basis that the final customer pays the full VAT, or that the final customer is not incorporated. However, the policing of such a system would be extraordinarily difficult and expensive, and is probably impractical.

7.2. Closed User Group Revenues

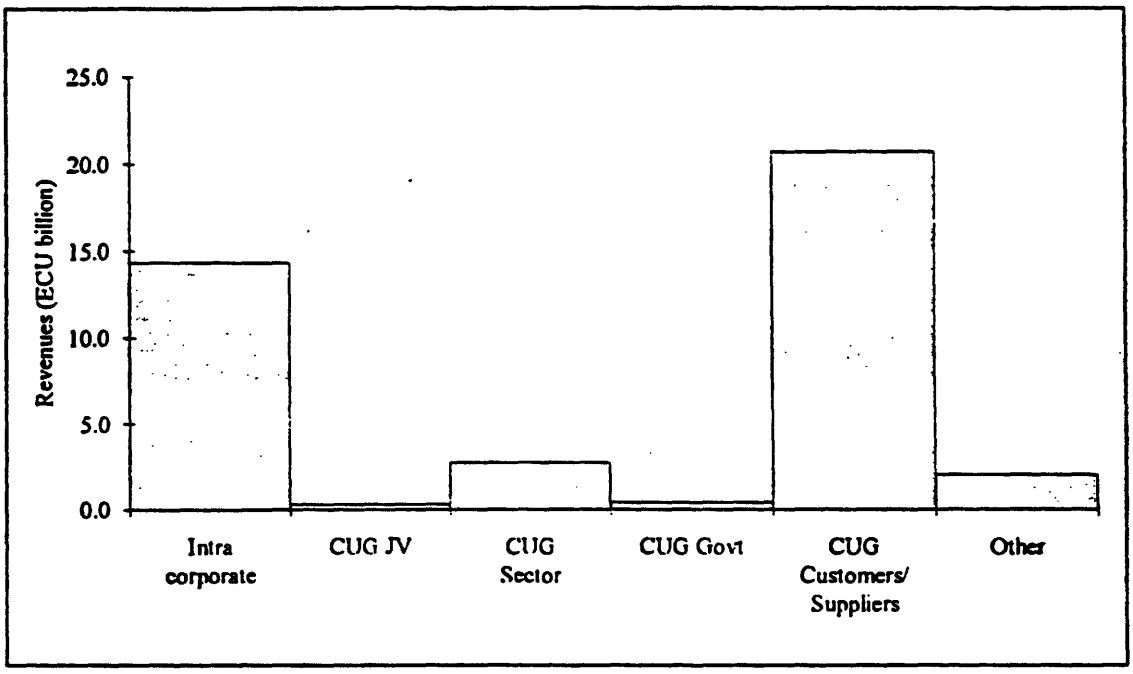
The above scenarios serve to illustrate how difficult it is to define meaningfully a closed user group. Ultimately, it appears that the only practical option is to adopt an inclusive approach and to define who may, rather than who may not, connect to such a network. The role of the approval body will be critical in determining the attractiveness to users of such an approach to the market place.

In estimating the possible effect on revenues under each scenario, Method 2 as described in Section 6 on corporate networks was used. The percentage of total corporate spend made on calls to each of the categories described above was estimated on a sector by sector basis. The results are illustrated in Exhibits 10 and 11 below.

EXHIBIT 10: Closed User Group Expenditure

Sector	*Total CUG spend (ECU billions)*	*% Business spend*
Joint Venture CUG	0.4	1%
Same Sector CUG	2.6	6%
Government CUG	0.7	2%
Customers/Suppliers CUG	21.8	54%
All other Telecoms spend	0.8	2%

EXHIBIT 11: Overall estimated breakdown of Corporate Telecoms Expenditure



It should be noted that Exhibit 10 gives estimates for total of corporate revenues which could be covered by a CUG definition and that no attempt was made to assess the percentage of that potential market which would actually use CUG networks to provide its communications. Two major factors will influence take-up:

- In general, 80% of communications takes place between 20% of the members of any class. In practice, therefore, it is likely that only 80% of the revenues in each of the above categories will be contested.
- If the CUG approval process becomes at all bureaucratic, many potential customers will decide that the gains do not outweigh the effort required to set up the network.

This latter factor is likely to influence the majority of the potential customer base, with the result that the actual impact of liberalisation on the TOs will be negligible.

7.3 Conclusions

From the analysis in section 7.2 it can be seen that a broad definition would make it possible to encompass almost all business expenditure on telecoms within the scope of either corporate network or closed user group services. Only a small fraction, estimated at approximately 2%, can be considered as communication with groups or

individuals with which the company does not have some form of business or professional relationship.

On the other hand, by adopting a more restrictive approach to the definition and authorisation of closed user groups, it is possible to define a CUG and corporate network market that accounts for approximately 50% of all business revenues. By exploring further the approaches to CUG definition illustrated here, it may be possible to define a satisfactory and acceptable process which allows competition in infrastructure to develop in a controlled manner over a period of transition.

8/ Differences between Analysys and CIT Market Estimates

CIT forecast the market for satellite business services in its 1993 report on satellites. Exhibit 12 showns CIT's revenues projections for 1992. The total market size of ECU 339 million is significantly different to estimates prepared by Analysys, but there are two major differences which explain this discrepancy:

- CIT's projections begin in 1992 not 1991. In some cases, CIT quotes assumed growth figures for the previous year; in others, the 1992 figures have been restated, using a CAGR figure calculated from the forecasts given for 1994 and 1996. On this basis, the market in 1991 was worth approximately ECU 272 million.

- CIT estimates include the service element in all of the market categories forecast. For example, in the case of SIS, CIT included revenues received to cover programme-making activities, as is the case with SNG and business TV services. Analysys figures are, with the exception of videoconferencing and SNG, estimates of the revenues accruing from the provision of space segment capacity and nominal rental (as opposed to outright purchase) of the CPE used to provide the link.

The size of the service component in each of the CIT categories was estimated and the market forecasts adjusted accordingly. This process resulted in a market size of ECU 123 million, which is directly comparable with the Analysys estimate of ECU 110 million. The difference of ECU 13 million, approximately 10%, is well within the expected margin of error.

One surprising figure is the revenue accruing from SMS/IBS services. This should show up on the TO accounts, but appears not to. In a study of Eutelsat activities, revenues from business services were estimated at around ECU 15 million.

EXHIBIT 12: Restatement of CIT figures.

Categories	*1992*	*1996*	*CAGR 1992-96*	*Derived 1991*	*Service Component*	*Transmission Revenues*
Information Services	87	176	27.0%	69	80%	14
SNG*	24	40	77.0%	14	50%	7
Business TV	18	63	80.0%	10	60%	4
Video Conferencing	11	18	22.2%	9	0%	9
Managed Trunk TV/Uplinks*	51	74	9.8%	46	0%	46
Managed Data Uplink	14	30	21.0%	12	0%	12
FM: one way VSAT	3	8	27.8%	2	50%	1
FM/MNS: two way VSAT	66	161	25.0%	53	50%	26
Two way Data (SMS/IBS)	64	100	11.8%	57	0%	57
TOTAL	338	670	18.7%	272		176
RESTATED in Analysys terms						123

Bold figures are provided by CIT
* Excluded from Analysys figures