

## Introduction

### The End of Territoriality in Communications

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The telecommunications industry, long organized along geographic and product lines that were both a shield and a weapon, is being transformed by contradictory forces: on the one hand, the trend toward global expansion by carriers, and on the other hand, fragmentation and entry in local communications. These transformations represents two sides of the same issue: a blurring of market boundaries created through technical innovation, policy liberalization, user initiatives, and entrepreneurialism. The result is a complex web of overlapping network definitions, product and service markets, carrier types, technical standards, government policies, financial arrangements, and cooperative ventures. This volume seeks to address the complexities of these bi-polar forces and to map out the policy issues which need to be addressed today and in the future.

#### 1. The Local Exchange: From Monopoly to Openness

Local exchange services, traditionally provided by landline facilities, were regulated as a "natural monopoly." With costs declining over the range of production, it was believed that single-firm supply was most efficient. This view discounted the dynamic benefits of rivalry. It lead to local exchange companies being given a monopoly status, subject to regulation.

This scenario was carried into a vision for the future of telecommunication. The conventional model for the evolution of telecommunications, offered by traditional monopoly carriers as their vision of the future, was the *integrated single superpipe*, merging all communications infrastructures into a single conduit controlled by themselves and interconnected internationally with similar territorially exclusive superpipes. This scenario of integration took no account of the simultaneous organizational centrifugalism that was taking place, first in the U.S. and then increasingly in other countries.

In the U.S., during the 1980s a new generation of local service providers emerged: fiber-based competitive access providers (CAPs). As businesses increasingly relied on communications services, there was an increased demand for risk-diversification through alternate networks. CAPs also provided cheaper alternatives to local exchange companies by connecting large end-users directly with long-distance carriers. Only recently have CAPs begun offering public local switched telephony services. CAPs are small, but rapidly growing. Their total revenues increased from \$300 million in 1993 to \$1.3 billion in 1995, still just one percent of the local exchange market. Elsewhere, competitive local entry was spearheaded by electric and gas utilities, e.g. Japan and Germany.

Cellular service, first offered in the U.S. in 1983, also emerged as a potential local entrant, although with limited capacity, higher price, and lower service quality. Since only one license was offered to a non-incumbent, competition with wireline services was minor; but multiple personal communications service systems have been licensed in 1995 and 1996 for each market, and are likely (possibly in alliance with cable or long-distance companies) to also become substitutes for landline local service.

In the 1970s, cable television developed as an efficient, low cost, and high capacity communication wire that today passes almost 90% of American homes, leading to a dual system of two parallel but very separate networks. CATV began as a means of providing quality broadcast signals and has grown to become the major multi-channel medium. Today, cable networks are beginning to be used to provide data services (including Internet access), voice services (particularly in the U.K.), and variants of switched video.

The Internet has also emerged as a new type of competitive carrier, using the LECs own facilities. While not a direct competitor for local services, Internet telephony, like the early CAPs, impacts one of the major sources of LEC revenue -- access charges. In the U.S., enhanced service providers are exempted from these charges; therefore, Internet service providers' long distance service directly affects local service companies.

Perhaps the most promising competitive local entrant in the short term is resale, likely in combination with offerings as a "full-service" package. In 1994, the New York State Public Service Commission approved the first large scale local service resale plan applied to the Rochester Telephone Co. Time Warner and AT&T were two of the major providers which entered as competitors in the market. The margin between local wholesale and retail rates became a major issues of contention. Following the 1996 Telecommunications Act, the Federal Communications Commission set the discount at 17-25%.

While local telephone companies are being assaulted on many fronts, they are still, by far, the dominant player in the market, as is shown in Table 1.

Carrier Type	Local Exchange		Local Private Line		Alternate Access and Other Local		Intrastate and Interstate Access	
Local Exchange Carriers	42,194.8	(99.8%)	1,125.1	(99.6%)	8,148.2	(97.9%)	33,370.2	(96.2%)
CAPs	7.4	(0.0%)	3.6	(0.3%)	152.5	(1.8%)	117.1	(0.3%)
Cellular Service Carriers	34.3	(0.1%)	N/A	(0.0%)	9.4	(0.1%)	55.2	(0.2%)
Pay Telephone Operators	11.8	(0.0%)	N/A	(0.0%)	N/A	(0.0%)	18.8	(0.0%)
Resellers	24.9	(0.0%)	0.5	(0.0%)	5.8	(0.0%)	716.9	(0.1%)
<b>Total Revenues by Sector</b>	<b>42,273.4</b>		<b>1,129.3</b>		<b>8,320.5</b>		<b>34,682.7</b>	

Source: Federal Communications Commission, *Telecommunications Industry Revenue: TRS Fund Worksheet Data*, February 1996.



In the United States, the dominance of the LECs is likely to be significantly altered. One of the main provisions of the 1996 Telecommunications Act is the opening up of local markets. The resale provision allows for multiple new competitors to enter into local markets, including long distance providers, cable companies, and other LECs.

These changes raise a host of questions. Section 1 of this book, *Dynamics of the New Local Communications Markets*, reviews the forces of change which have driven the opening of the local access market in the first place. In *Competition and Local Communications: Innovation, Integration and Entry*, David Teece (University of California, Berkeley) and Gregory L. Roston (Federal Communications Commission) discuss the factors which led to the economic obsolescence of national monopolies. In *Lessons learned from Long Distance Competition*, Michael Noll (University of Southern California) skeptically analyzes the results of competitive entry into the long distance market in the US. In *Turning the Cables: Cable Entry into Telecommunications*, Glenn Woroch (University of California, Berkeley) examines the role of local telecom policy (e.g. the cross-ownership ban) in leading to the efforts of alternative entry into telephony by the cable industry. In *Changing Corporate Culture in the Local Competitive Environment*, James E. Katz (Bellcore) looks at how the management of telecommunications companies must change as a result of competition. In *Can local Communications be Self Policing? A Proposed Discovery Procedure*, John Haring (Strategic Policy Research) suggests how to simplify the piecemeal approach toward competitive entry.

The competitive inroads into most segments of telecommunications have limited the ability to generate the funds for internal cross-subsidies which may make the support for universal connectivity possible. Since the demands for maintaining universal service have not declined, the old system has been propped up in a complex fashion. Therefore, if one wants to continue to assure the electronic interconnectivity of all members of society, how does one pay for it?

Internal transfers inside a monopoly system have been the instruments of redistribution, but other mechanisms can be designed within market structures. This is discussed in Section 2, *Universal Service: Creating Effective Policies for the Future*. Articles by Eli Noam (Columbia), Michael Einhorn (U.S. Department of Justice), and Bruce Egan (Columbia Institute for Tele-Information) and Steve Wildman (Northwestern) suggest new methods for collection and distribution of universal services. Heather Hudson (University of San Francisco) examines the obstacles facing rural areas in the future. Koichiro Hayashi (NTT) provides a comparative study of the evolution of universal service policy in Japan, and the implications of a competitive environment to the provision of universal services. Jorge Reina Schement (Rutgers University), Alex Belinfante (FCC) and Larry Povich (FCC) go beyond traditional definitions of universal service to examine telephone access by socio-economic background.

## 2. Telecommunications Without Frontiers

The erosion of local monopolies is only part of the change. At the other end, domestic telecom carriers are reaching to new markets abroad. International telecommunications have existed for more than a century; however, they were almost always collaborations of territorial or service monopolies. What has changed is that now telecommunication organizations cross borders. Section 3, *Communications Beyond Frontiers: Expansion of National Carriers Across Borders*, examines the reasons behind these changes. In these chapters, Gregory Staple

(Telegeography) looks at how seamless global telecommunications reduces the significance of physical borders. Russell Newman (Tufts) looks at the economies of multinational content companies in *Mega Media: The Growth of International Media Conglomerates*. Jonathan Aronson of the (University of Southern California) examines the conflicting forces of market demand for global telecommunications services and governmental sovereignty.

On the supply side, liberalization has resulted in new market participants; privatization enabled foreign ownership of the traditional carriers; and international alliances served as a prudent course for both expansion and defense alike. On the demand side, pent-up consumer needs led developing countries to seek foreign carriers' investment and expertise, while large users sought global communications services to match the scope of their business operations. The size of the market for such "seamless" services is estimated to grow to \$25 billion by the year 2000. Transnational service provided opportunities to align with other providers. Multi-national partnerships also provide carriers with indirect market access to monopolized markets, dilute risk for new services or activities, and pool political influence to obtain licenses. Section 4, *Investment Drivers for Global Telecommunications*, examines investment patterns and strategies for multinational carrier formation. Cristiano Antonelli (University of Torino) details how alliances are formed between national operators. Aine NíShuilleabháin (INSEAD) and Richard Kramer (Goldman Sachs) examine how investment trends can be examined to provide insight into the structure of multinational service provision. Michael Salinger (Boston University) looks at the forces affecting the market place for telecom investment capital in *Finance: Buying and Banking on Prospective Returns in Telecom*.

There are several models for multi-national aggregation. These include

**Traditional international carriers:** such as Cable & Wireless, the former British colonial carrier that operates in over 50 countries, and expanded upon that foundation.

**Traditional collaborative carriers:** such as Intelsat and Inmarsat and their regional equivalents Eutelsat and Arabsat. There are also many other consortia of established national operators for international submarine cables.

**Global Alliances** such as Concert (BT, MCI), GlobalOne (Deutsche Telekom, France Telecom, Sprint), and Uniworld (AT&T, KPN, Swiss Telecom PTT, Telefonica, Telia) are formed through consolidation of international resources and access combined with a homogeneous marketing platform.

**Regional and national ventures:** These ventures span an extraordinary range of countries and companies. There are detailed in two comprehensive appendices by Eli Noam and Anjali Singhal (Columbia Institute for Tele-Information).

**New types of supra-national carriers:**

- ▶ Low-Earth Orbiting Satellite Carriers (LEOs)
- ▶ Light carriers and Systems Integrators
- ▶ Internet-based telecommunications service providers



New international strategies collide with traditional regulatory policies. In some cases, domestic carriers are handicapped from operating internationally. In other cases, domestic restrictions provide carriers with a shield. For example, international activity coupled with asymmetric liberalization enables an extension of national market power internationally. Domestic openness with international restrictions does the opposite. The frictions of new industry and old regulation extend in a variety of areas:

**Pricing:** National price and profit regulation can be undermined by carriers shifting revenues and costs among jurisdictions, either in real or accounting terms.

**Investment:** Varying policies on foreign investment policy and on the market participation of domestic firms affect international investment flows. Domestic regulatory restrictiveness in one country may lead to investment abroad. Asymmetric foreign ownership provision can lead to countries leveraging their international presence while keeping domestic markets closed.

**Content policy:** A worldwide harmonization of content policy is undesirable due to divergent national views. Yet when each country enforces its own rules, the most restrictive content regulations may dominate by subjecting distant content providers to liability.

**Privacy and Security:** The national protection of security and privacy of communications traveling across the globe is difficult. In privacy protection, it is possible to avoid data protection laws by the shifting of data abroad.

**Quality:** Quality standards are harder to maintain in an international chain of transmission, and uniform or minimum standards may lead to needlessly high standards for poor countries. Network crashes in one country may spill over across borders.

**Employment:** National labor relations in telecommunications are affected because some employment can be shifted to low-wage, low-union countries.

**Standards:** Carriers operating abroad may take their domestic technical standards with them, leading to multiple parallel standards.

As this list suggests, as multinational carriers emerge, the traditional regulatory environment must change, too. Section 5, *Policy Issues for the New Global Communications Environment*, addresses current barriers and future issues for a global regulatory framework. Yoshiko Kurisaki (SITA) and Keith Bernard (Hong Kong Telephone) examine the regulatory barriers to global service provision in *Challenge to Globalism: Toward a New Framework of Telecommunications Policy* and *Global Telecommunications Services: the Regulatory Challenge*. Liching Sung (University of Texas) provides a case study for standard setting in a global environment in *Standards Competition in Wireless: Regionalism vs. Globalism - The Case of the Third Generation Mobile Communications System*. Jean-Pierre Chamoux (Droit & Informatique) looks at the status of carriers in a post-privatization world in *Neo-Colonialism*

*After Privatization?*. Albert Halprin (Halprin, Temple & Goodman) proposed an alternative international settlements system. Klaus Grewlich (Deutsche Telekom) analyzes anti-trust implications of joint ventures and acquisition in the article *International Anti-Trust Issues*.

Traditional regulatory tools were predicated on a certain industry structure, nearly always territorial monopolies. But that system is in the process of changing to multi-network competition and transnational carriers.

Regulatory environments of the future range widely, including:

- ▶ **A supra-national regulatory agency** with full powers.
- ▶ **Two-level regulation with preemption** is a variant of supra-regulation, with national and supra-national agencies coexisting.
- ▶ **Harmonization** of regulatory inconsistencies among countries by negotiation.
- ▶ **Regulatory treaties** among countries.
- ▶ **Regulatory coordination by national agencies.**
- ▶ **Ad-hoc collaboration** on problems as they arise.
- ▶ **Dispute resolution** with arbitration of regulatory conflicts among countries.
- ▶ **Coordination by specialized international telecommunications bodies** without enforcement power.
- ▶ **General international bodies**, such as GATT or WHO, that coordinate telecommunications policy in the context of broader issues such as trade policy and economic reform.
- ▶ **Deference** to a "lead country" that initiates a regulatory proceeding on a particular issue.
- ▶ **Information exchange** on company finances, technical performance, or consumer fraud problems.
- ▶ **Law enforcement collaboration.**
- ▶ **International financial lending institutions**, such as the World Bank, may leverage their economic control to promote reform in developing countries.
- ▶ **Coordination by carriers** is the traditional way of collaboration. It is simpler for operating companies than coordination through governments.
- ▶ **User coordination** as in the case of self-governance of the Internet.
- ▶ **Coordination by systems integrators** who meet the different requirements of each country.
- ▶ **Foreign intervention in national proceedings** -- countries participate in the regulatory proceedings of other countries. By entering another country's regulatory process, a country implicitly grants reciprocal opportunities.
- ▶ **Non-coordination under regulation** countries may not coordinate policy but instead adjust to changes by others. This can lead to stable equilibriums, even in the absence of formal coordination. In some cases, however, countries may drive each other to "corner solutions" and reach a policy of substantial strictness or laxity.
- ▶ **Non-coordination under competition** -- Countries liberalize, do not coordinate, and do not even adjust regulation, but rather allow global market forces to operate. This strategy does not solve all problems, especially law enforcement issues and redistributive initiatives.



### 3. Outlook

As networks become interconnected into a mesh-like network of networks, distinctions among local, long distance, and international telecommunications fade away. However, the social superstructure has not changed as rapidly. Domestic interests and national sovereignty will not be supplanted by technology. Telecommunications markets and regulatory forces will continue to clash.

From a local perspective, liberalization of market entry, upgrade of technology, reform of universal service issues, and common carriage are key to realigning telecommunications markets. The demand for new applications, such as multi-media over networks, raises questions about the treatment of historical investments in networks; how to upgrade networks at the same time as competition; how to retain service quality in a network of networks; and how universal service should be allocated and financed.

Because of the policy spillovers between local and international regulation, one cannot create complex mechanisms of policy coordination which supplant established national institutions. It is better to reduce deregulatory asymmetry through liberalization instead of creating regulatory symmetry through elaborate coordination.

After liberalization, there will still need to be coordination for some policy problems, such as redistributive goals, law enforcement issues, and the transition to a competitive system, which may require interconnection arrangements. It will only hamper the global economy if one tries to protect social subsidies through a protection of the entrenched monopoly market structure and through a defense of that system internationally. What the world of telecommunications needs today is more policy experimentation rather than trying to create a homogeneous solution for a heterogeneous world.

### 4. Acknowledgments

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This book is a logical continuation of C.I.T.I.'s exploration of long-term trends and their near-term implications. The first volume, *Integrated Broadband Networks* (M. Elton, ed; Elsevier, 1991), examined the issues involved in the implementation of a high capacity optical fiber network to provide integrated telecommunications services. This was followed by the project *Private Networks and Public Objectives: Policy, Economics, and Technology* (E. Noam

and A. NíShuilleabháin, eds.; Elsevier, 1996), as a study on the centrifugalism that affects networks. The next volume in this series, *The Impact of Cybercommunications on Telecommunications* (E. Noam, ed; forthcoming 1997), looks at how communications over computer based networks, such as the Internet, competes and integrates with other traditional players such as telephone operators, mass media providers, and content companies.



## Appendix A: Investments of Major Carriers

### ◆ AirTouch (formerly part of Pacific Telesis, US)

- |    |        |  |
|----|--------|--|
| a. | 51%    | NordicTel (Sweden)   |
| b. | 34.8%  | Mannesman Mobilfunk (Germany)  |
| c. | 25%    | Belgacom Mobile (Belgium)  |
| d. | 23%    | Telecel (Portugal)   |
| e. | 19.25% | Polkomtel (Poland)   |
| f. | 15.8%  | AirTel/ASR (Spain)   |
| g. | 15.8%  | OmniTel (Italy)  |
| h. | 9%     | interest in trans-Pacific cable between Japan and US   |
| i. | 6.4%   | GlobalStar with Alcatel Espace (France), Dacom (Korea), Deutsche Aerospace, France Telecom, Hyundai Electric (Korea), Loral (US), Qualomm (US), Vodaphone (UK)). |
| j. | 4.5%   | Tu-Ka Chugoku (Japan)  |
| k. |        | cellular operations in India, Italy, Poland, Portugal, Spain, South Korea, and Sweden.   |
| l. |        | paging systems in France, Portugal, Spain and Thailand   |

### ◆ Ameritech (US)

- |    |       |   |
|----|-------|---|
| a. | 67%   | Matav (Hungary) jointly with Deutsche Telekom   |
| b. | 50%   | MagyarCom (Hungary)   |
| c. | 49.9% | Telecom New Zealand jointly with Bell Atlantic  |
| d. | 40%   | ADSB Telecommunications, the consortium which owns 49.9% of Belgacom. Belgacom owns 14.5% of Infonet. |
| e. | 25%   | Centertel (Poland)  |
| f. | 12.3% | Belgacom Mobile (Belgium)   |

### AT&T (US)

- |    |       |                               |
|----|-------|-------------------------------|
| a. | 100%  | AT&T Puerto Rico              |
| b. | 62.2% | AT&T Jens (Japan)             |
| c. | 55%   | Rosnet International (Russia) |
| d. | 50%   | A/O Telmos (Russia)           |
| e. | 49%   | Birla Communications (India)  |
| f. | 40%   | Uniworld                      |
| g. | 35%   | Celumovil (Colombia)          |
| h. | 35%   | Jamaica Digiport Int'l        |
| i. | 33%   | Unitel (Canada)               |
| j. | 30%   | Smartone (Hong Kong)          |
| k. | 22%   | Movitel del Noroeste (Mexico) |

- l. 20% PT Bukaka Singapore Telecom Int'l Indonesia)
- m. 20% Alestra (Mexico)
- n. 17% UTEL (Ukraine)
- o. 10% Compania de Telefonos de Interior (Argentina)
- p. 10% Celumovil de la Costa (Colombia)
- q. Otecel (Ecuador)
- r. Yunnan & Xhia (China)
- s. NTT FAN (Japan)
- t. WorldPartners (a loose association of carriers including KDD, KPN, Singapore Telecom, Swiss Telecom PTT, Telefonica, and Telia as equity owners. Hong Kong Telecom, Korea Telecom, Philippines Long Distance Telephone, Telecom New Zealand, Telstra, and Unitel (Canada) are non-equity partners.
- u. Africa ONE -- 37,000km submarine cable surrounding the continent. Partners with ITU, RASCOM (Africa), PATU (Africa), and Alcatel.

◆ **Bell Atlantic (US, to be merged with NYNEX)**

- a. 49.9% Telecom New Zealand jointly with Ameritech
- b. 49% Iusacel (Mexico)
- c. 49% Pacific Star Communications (New Zealand)
- d. 33% Infostrada (Italy)
- e. 24.5% Eurotel Cellular Service (Czech and Slovak Republics)
- f. 11.6% OmniTel (Italy)
- g. Wireless operations in Argentina, Denmark, France, Germany, New Zealand, Uruguay, Venezuela
- h. provision of consulting, network, and software development services to telecommunications operators in Finland, Italy, South Korea, Sweden

◆ **NYNEX (to be merged with Bell Atlantic)**

- a. managing partner of FLAG --- fiber cable linking UK, Japan and intermediate points. Partners include Dallah Al-Barkhad (Saudi Arabia) and Marubeni (Japan).
- b. 75% Cablecomms (UK) (cable TV and telecommunications)
- c. 50% Gibraltar-Nynex Communications
- d. 50% Nynex-Reliance Cellular (India)
- e. TelecomAsia (Thailand)
- f. cellular ventures in Greece and Japan

◆ **Bell Canada Enterprises (BCE)**

- a. 87.2% Bell CableMedia (UK)
- b. 23% Videotron (UK)
- c. 20% Mercury (UK)



- d. Worldlink Telecom (Canada)  
 e. Iridium partners with Motorola (US), Sprint (US), Raytheon (US), Pacific and Electric Cable (Taiwan), Mawarid Group (Saudi Arabia), Krunichev (Russia), Nippon Iridium (18 large companies including Sony and Mitsubishi), China Great Wall, Muidiri (Venezuela), Lockheed Martin (US), STET, Telefonica, United Communications (Thailand) and Vebacom (Germany).

◆ **BellSouth (US)**

- a. 24.5% Optus (Australia)  
 b. 21.4% E-Plus PCN (Germany)  
 c. mobile data network in U.K.  
 d. paging and answering services in Australia and UK  
 e. cellular and/or mobile operations in Argentina, Chile, Denmark, France, Mexico, New Zealand, Uruguay, Venezuela

◆ **BT (UK)**

- a. 75% Concert  
 b. 60% Cellnet (UK)  
 c. 50.5% Albacom (Italy)  
 d. 50% Gibtel (Gibraltar)  
 e. 50% Megared (Spain)  
 f. 50% Wipro (India)  
 g. 50% Viag Interkom (Germany)  
 h. 49% India Cellular  
 i. 40% Mahindra (India)  
 j. 40% Max BT (India)  
 k. 40% St. Petersburg Int'l (Russia)  
 l. 33% Telenordia (Sweden)  
 m. 25% Clear Communications (New Zealand)  
 n. 25% Newton (Israel)  
 o. 20% Personal Communications (Hong Kong)  
 p. 20% MCI (US)  
 q. 6.3% Airtel/ASR (Spain)  
 r. 5% Tu-Ka Cellular (Japan)  
 s. Network Information Services (Japan)

**Cable & Wireless (UK)**

- a. 100% C&W Inc. (US)  
 b. 100% Telecom Vanuatu (Asia Pacific)  
 c. 97% Eastecnica (Portugal)  
 d. 85% Barbados External Telecommunications  
 e. 80.7% Paktel (Pakistan)

f.	80%	Mercury (UK)
g.	79%	Telecommunications of Jamaica
h.	70%	Grenada Telecommunications
i.	63%	Tilts Communications (Latvia)
j.	58%	Hong Kong Telecommunications
k.	51%	Companhia de Telecomunicacoes de Macau
l.	51%	Tele-Yemen
m.	51%	Yemen International Telecommunications Company
n.	50%	Belcel (Belarus)
o.	50%	C&W Europe
p.	50%	Mercury One 2 One (UK)
q.	49%	Fiji International Telecommunications
r.	49%	Mobilkom (Belarus)
s.	45%	Dhivehi Raajjeyge Gulhun Private (Maldives)
t.	45%	Vebacom (Germany)
u.	40%	ETPI (Philippines)
v.	39.9%	Tele 2 (Sweden)
w.	25%	MTN (South Africa)
x.	24.5%	Optus (Australia)
y.	22.3%	Ocel (Colombia)
z.	21%	Lattekom (Latvia)
aa.	20%	Batelco (Bahrain)
bb.	20%	Bouyges Telecom (France)
cc.	17.6%	International Digital Communications (Japan)
dd.	12.8%	Bell CableMedia (UK)
ee.	10%	Bezeq (Israel)
ff.	.03%	Videotron (UK)
gg.		Metropolitan Communications (Russia)
hh.		PHS International (Japan)
ii.		Asiasat
jj.		MobileOne (Singapore)

◆ Deutsche Telekom

a.		GlobalOne (100% Germany, 33% Europe, 25% World, 16.5% North America)
b.	67%	Matav (Hungary) with Ameritech
c.	50%	Atlas (with France Telecom)
d.	50%	MagyarCom (Hungary)
e.	27%	Mobil TeleSystems (Russia)
f.	25%	PT Satelindo (Indonesia)
g.	21%	TRI (Malaysia)
h.	20%	Teletes (Turkey)
i.	17%	UTEL (Ukraine)
j.	16%	Ukrainian Mobile Communications (UMC)
k.	10%	Sprint (US)



◆ **France Telecom**

a.		GlobalOne (100% France, 33% Europe, 25% World, 16.5% North America)
b.	100%	FTNS Nordic (Sweden)
c.	90%	Mobistar (Belgium)
d.	70%	Societe Ivorian de Mobiles (Ivory Coast)
e.	50%	Atlas (with Deutsche Telecom)
f.	49%	Operator Hungaria
g.	49%	OPT-New Caledonia
h.	49%	Telecoms Ext. de la Polynesie Francaise
i.	40%	Socatel (Central African Republic)
j.	40%	DGCT (Equatorial Guinea)
k.	35.5%	BPL Systems (India)
l.	35%	Panafon (Greece)
m.	34%	Sonatel (Senegal)
n.	33%	Vanitel (Vanuatu)
o.	33%	Vanitel Cellular (Vanuatu)
p.	25%	Centertel (Poland)
q.	20%	St. Pierre & Miquelon (France)
r.	19.5%	Telecom Argentina
s.	11%	Mobil Telesystems (Russia)
t.	10%	MoviStar (Argentina)
u.	10%	Sprint (US)
v.	5%	Telmex (Mexico)
w.	3.2%	GlobalStar
x.		Radiomovil (Mexico)
y.		Teco Tasa (Uruguay)
z.		Telcel (Mexico)
aa.		PT Pramindo Ikat Nusantara (Indonesia)

◆ **GTE (US)**

a.	100%	British Columbia Telephone
b.	100%	Quebec Telephone
c.	100%	Codetel (Dominican Republic)
d.	51%	of consortium including Lucent and Telefonica which owns 40% of CANTV (Venezuela)
e.	14.5%	Alestra (Mexico)
f.	4.5%	Tu-Ka Chugoku (Japan)
g.		partner in cellular consortia in Germany and Argentina
h.		provides international telecommunications services to Moscow hotels
i.		joint venture in China to provide paging services

◆ **KPN (Netherlands)**

- |    |       |                                       |
|----|-------|---------------------------------------|
| a. | 50%   | JaszTel (Hungary)                     |
| b. | 25%   | Unisource                             |
| c. | 20%   | Pannon GSM (Hungary)                  |
| d. | 17%   | UTEL (Ukraine)                        |
| e. | 16%   | Ukrainian Mobile Communications (UMC) |
| f. | 15%   | Uniworld                              |
| g. | 13%   | SPT Telecom (Czech Republic)          |
| h. | 14.5% | Infonet                               |
| i. |       | WorldPartners                         |

◆ **MCI (US)**

- |    |       |                                    |
|----|-------|------------------------------------|
| a. | 100%  | MCI de Venezuela                   |
| b. | 49%   | Avantel (Mexico)                   |
| c. | 25%   | Clear Communications (New Zealand) |
| d. | 25%   | Concert                            |
| e. | 23.5% | Belize Telecom                     |
| f. | 15%   | Newtone (Israel)                   |
| g. |       | MCI-Stentor (North America)        |
| h. |       | AskyB (US)                         |

◆ **NTT (Japan)**

NTT, the world's largest telecommunications company, faces limitations on its international service role.

- |    |       |  |
|----|-------|--|
| a. | 44%   | NTT FAN (Future Agent network -- for global multimedia services) |
| b. | 18.5% | Thai Telephone & Telecommunication (TT&T)                        |
| c. | 15%   | Smart Communications (Philippines)                               |
| d. | 2%    | Nextwave Communications (US) PCS                                 |
| e. | 0.9%  | Nextel Communications (US)                                       |
| f. |       | PHS International (Japan)  |
| g. |       | Mobile venture in China.   |

◆ **SBC (formerly Southwestern Bell, US)**

- |    |        |   |
|----|--------|---|
| a. | 40%    | VTR Inversiones (Chile)   |
| b. | 15.5%  | MTN (South Africa)  |
| c. | 11.75% | Telewest (UK) (largest cable television/telecommunications operation) |
| d. | 10%    | SFR (France)  |
| e. | 8.3%   | Shinsegi Mobile Communications (South Korea)                          |
| f. | 5%     | Telmex (Mexico)   |
| g. |        | alliances in Australia and Israel                                     |

◆ **Singapore Telecom**

a.	100%	Information Network Services (Indonesia)
b.	76%	Lanka Cellular Services (Sri Lanka)
c.	55%	Infolink Network Services (Australia)
d.	52%	Lanka Communications Services (Sri Lanka)
e.	50%	Globe Telekom (Phillippines)
f.	40%	PT Bukaka Singapore Telecom International (Indonesia)
g.	27%	ADSB Telecommunications, consortium which owns 49.9% of Belgacom. Belgacom owns 14.5% of Infonet.
h.	24.5%	AAP Telecommunications (Australia)
i.	20%	Asean Holdings (Asia-Pacific region)
j.	12.3%	Belgacom Mobile (Belgium)
k.		WorldPartners

◆ **Sprint (US)**

a.		GlobalOne (100% US, 66% North America, 50% world, 33% Europe)
b.	100%	Sprint Communications Canada
c.	60%	Sprint Business Telecom (Bulgaria)
d.	51%	Sprint Movil (Argentina)
e.	50%	Rosprint (Russia)
f.	50%	Sprint Networks (Russia)
g.	49%	Alcatel Data Networks (France)
h.	26%	Sprint RPTelekom (Poland)
i.		Iridium

◆ **STET (Italy)**

a.	50%	Entel (Bolivia)
b.	20%	Entel (Chile)
c.	12.5%	Etecsa (Cuba)
d.	19.5%	Telecom Argentina
e.	12%	TMobil (Czech Republic)
f.		Iridium

◆ **Swiss Telecom PTT**

a.	50%	JaszTel (Hungary)
b.	30%	Natel D (India)
c.	30%	Muitara Telecommunications (Malaysia)
d.	25%	Unisource
e.	15%	Uniworld
f.	14.5%	Infonet
g.	13%	SPT Telecom (Czech Republic)
h.		WorldPartners



◆ **Telefonica (Spain)**

a.	80%	Telefonica Larga Distancia de Puerto Rico
b.	60%	Telefonica Telemobil (Romania)
d.	44%	CTC Cellular (Chile)
e.	43.6%	Compania de Telecomunicaciones de Chile (CTC)
f.	40%	of Chilean cable-telecommunications joint venture with TCI (US) and two Chilean cable companies
g.	35%	Telefonica del Peru
h.	31%	Codelco (Colombia)
i.	25%	Unisource
j.	22%	Cocolo (Colombia)
k.	22%	of consortium which owns Telefonica de Argentina
l.	16%	of consortium which owns CANTV (Venezuela)
m.	15%	Contactel (Portugal)
n.	15%	Uniworld
o.	14.5%	Alestra (Mexico)
p.	14.5%	Infonet
q.	10%	Teco Tasa (Uruguay)
r.	10%	MoviStar (Argentina)
s.		Iridium
t.		WorldPartners

◆ **Telia (Sweden)**

a.	60%	Starman Elektroonika (Estonia)
b.	26%	Namibia GSM
c.	25%	Lat Mobilais Telfons (Latvia)
d.	25%	Unisource
e.	25%	NW GSM (Russia)
f.	24.5%	Eesti Mobiltelfon (Estonia)
g.	15%	Uniworld
h.	14.5%	Infonet
i.	13%	Pannon GSM (Hungary).
j.	6.8%	OmniTel (Italy)
k.		WorldPartners

◆ **US West**

a.	50%	Mercury One 2 One (UK)
b.	45%	Delta Telecom (Russia)
c.	41.9%	Westel Radiotelefon (Hungary)
d.	26.75%	Telewest (UK) (largest cable television/telecommunications operator)
e.	24.5%	Eurotel Cellular (Czech and Slovak Republics)
f.	22%	Moscow Cellular Communications (Russia)
g.	5%	Bouyges Telecom (France)
h.		Tu-ka Cellular

- i. Titus Communications (Japan)
- j. personal communications network operations in UK
- k. international telecommunications gateways in Russia and Lithuania
- l. Other cable operations in Belgium, France, Germany, Hungary, Japan, Spain and Sweden.
- m. Other cellular operations in France, India, Japan, and UK.

## Appendix B: Alliances and Investments

### Global Alliances:

**Concert:** BT (UK, 75%) and MCI (US, 25%). BT acquired a 20% interest in MCI in 1994.

**FLAG:** NYNEX (US) is the managing partner of the 17,000-mile "Fiber-optic Link Around the Globe" whose partners include Dallah Al-Barkara (Saudi Arabia), Marubeni (Japan).

**GlobalOne:** GlobalOne separates its operations into three regions, North America, Europe, and the World. Sprint (US, 66% North America, 33% Europe, and 50% World); France Telecom (France, 16.5% North America, 33% Europe, 25% World); and Deutsche Telekom (Germany, 16.5% North America, 33% Europe, 25% World) each control different shares of each regional operation. FT and DT also purchased 10% each of Sprint in 1996.

**GlobalStar:** AirTouch (US, 6.4%), Alcatel Espace (France, 4.7%), Dacom (Korea, 1.3%), Deutsche Aerospace (Germany, 3.7%), France Telecom (3.2%), Hyundai Electric (Korea, 5.1%), Loral (US, 35.8%), Qualcomm (US, 7.9%), Vodafone (UK, 7.5%).

**Infonet:** Telefonica (Spain, 14.5%), Swiss Telecom PTT (14.5%), Belgacom (Belgium, 14.5%), KPN (Netherlands, 14.5%), Telia (Sweden, 14.5%), Telstra (Australia, 14.2%), KDD (Japan, 13.3%).

**Iridium** Motorola (US), Sprint, Bell Canada, Raytheon (US), Pacific and Electric Cable (Taiwan), Mawarid Group (Saudi Arabia), Krunichev (Russia), Nippon Iridium (18 large Japanese companies, including Sony and Mitsubishi), China Great Wall, Muidiri (Venezuela), Lockheed Martin (US), STET (Italy), Telefonica, United Communications (Thailand), Vebacom (Germany).

**Odyssey TRW** (US, 50%), Teleglobe (Canada, 50%).

**Orion** British Aerospace (25%), Com Dev (Canada, 4.2%), Kingston Communication (UK, 4.2%), Lockheed Martin (8.3%), Matra-Hachette (France, 8.3%), Nissho Iwai (Japan, 8.3%), Orion Network Systems (US, 16.6%).

**Teledesic:** William Gates, Craig McCaw, McCaw development, Kinship Partners.

**Uniworld:** AT&T (US, 40%), and **Unisource** (60%), which in turn is owned by KPN (25%), Swiss Telecom PTT (25%), Telefonica (25%), Telia (25%).

**WorldPartners:** a loose association of carriers with AT&T, KDD, KPN, Singapore Telecom, Swiss Telecom PTT, Telefonica, and Telia as equity owners, and Hong Kong Telecom, Korea Telecom, Philippines Long Distance Telephone, Telecom New Zealand, Telstra, and Unitel (Canada) as non-equity partners.

### Western Europe:

**Belgium:** *Belgacom Mobile* (AirTouch (25%), Ameritech (US, 12.3%), Belgian Government (37.6%), Singapore Telecom (12.3%), TeleDanmark (12.3%)); *Belgacom* (49.9% equity interests by ADSB Telecommunications (consortium comprising Ameritech (40%), Singapore Telecom (27%), Tele Danmark (33%)); *Mobistar* (France Telecom 90%), Telinfo (Belgium, 10%).



**France:** *Bouyges Telecom* (C&W (UK, 20%), US West (5%), Veba (Germany, 15%)); *SFR* (SBC (US, 10%), Vodafone, Cie Generale des Eaux (France)); *Alcatel Data Networks* (Sprint (49%), Alcatel Alsthom (51%)); *St. Pierre & Miquelon* (France Telecom (20%)).

**Germany:** *E-Plus PCN* (BellSouth (US, 21.4%), Thyssen Telecom (28.4%), Vebacom (28.4%), Vodafone (16.4%)); *Vebacom* (C&W (45%), Veba (Germany, 55%)); *Viag Interkom* (BT (50%), Viag (Germany, 50%)); *Mannesman Mobilfunk* (AirTouch (34.8%), Mannesman AG (Germany)).

**Gibraltar:** *GibTel* (BT (50%), Gibraltar government (50%)); *Gibraltar-NYNEX Communications Company* (Gibraltar government (50%) and NYNEX (50%));

**Greece:** *Panafon* (France Telecom (35%)).

**Ireland:** *Esat Digifon* (Comunicorp (Ireland, 40%), ITU Nominees (Ireland, 20%), Telenor (Norway, 20%)).

**Italy:** *Albacom* (BT (50.5%), Banco Nazionale del Lavoro (Italy, 49.5%)); *Infostrada* (Bell Atlantic (US, 33%), Olivetti (Italy, 67%)); *OmniTel* (Bell Atlantic (11.6%), Olivetti (41.5%), Telia (6.8%), AirTouch (15.8%), Mannesman AG (6%)).

**Spain:** *AirTel/ASR* (AirTouch (15.8%), BT (6.3%), Banco Santander and Banco Central Hispano (27.4%), Group of regional Spanish banks and utilities (16.8%)); *Megared* (BT (50%), Banco Santander (Spain, 50%)).

**Sweden:** *FTNS Nordic* (France Telecom (100%)); *Telenordia* (BT (33%), Tele Danmark, Telenor); *Tele2* (C&W (39.9%), Kinnevik (Sweden, 60.1%)); *NordicTel* (AirTouch (51%), Vodafone (19.5%), consortium of Swedish banks (29.5%)).

**Portugal:** *Contactel* (Telefonica (15%)); *Eastecnica* (C&W (97%)); *Telecel* (AirTouch (23%), Espirito Santo (Portugal, 38.5%), Amorim (Portugal, 38.5%)).

**UK:** *Telewest* (Cox (US, 11.75%), SBC (11.75%), TCI (US, 26.75%), US West (26.75%)); *Videotron* (Bell Canada (23%), C&W (.03%)); *Bell CableMedia* (Bell Canada International (42%), Jones Intercable (12.3%), C&W (12.8%)); *Cablecomms* (NYNEX (75%)); *Cellnet* (BT (60%), Securicor (UK, 40%)); *Mercury* (C&W (80%), Bell Canada Enterprises (20%)); *Mercury One 2 One* (C&W (50%), US West (50%)).

**Europe general:** *Atlas* (Deutsche Telekom (50%) and France Telecom (50%)); *C&W Europe* (C&W (50%) and Veba (50%)); *Unisource* (KPN (25%), Swiss Telecom PTT (25%), Telefonica (25%), Telia (25%)).

#### **Eastern Europe:**

**Armenia:** *Armentel* (two Armenian PTOs and Trans-World Telecom (US)).

**Belarus:** *Belcel* (C&W (50%), Belarus government (50%)); *Mobilkom* (C&W (49%), Bulgarian Telecommunications (51%)).

**Bulgaria:** *Sprint Business Telecom* (Sprint (60%), Bulgarian Telecommunications (40%)).

**Czech and Slovak Republics:** *Eurotel Cellular Service* (US West (24.5%), Bell Atlantic (24.5%), Czech PTO (25%), Slovak PTO (25%)); *SPT Telecom* (Swiss Telecom PTT (13%), KPN (13%)); *TMobil* (DeTeMobil (Germany, 84.5%), STET (12%), three Czech companies).

**Estonia:** *Eesti Mobiltel* (Estonian PTO, Telecom Finland, Telia (24.5%)); *Starman Elektroonika* (Telia (60%)).

**Hungary:** *Matav* (67% Ameritech and Deutsche Telekom through their joint venture, MagyarCom); *MagyarCom* (Ameritech (50%), Deutsche Telekom (50%)); *Pannon GSM* (KPN (20%), local Hungarian carriers, Nortelinvest (Norway), Telecom Finland, Tele Danmark, Telia (13%)); *Operator Hungaria* (France Telecom (49%), Antenna Hungaria (51%)); *Westel Radiotelefon* (US West (41.9%), Matav (Hungary, 43.6%), KFT (Hungary, 9.5%), World Bank/IFC (5%)); *JaszTel* (Swiss Telecom PTT (50%), KPN (50%)).

**Latvia:** *Lat Mobilais Telfons* (Telecom Finland, Telia (25%), three Latvian companies); *Tilts Communications* (C&W (63%), Lattelekom (Latvian PTO), Telecom Finland, World Bank/IFC); *Lattelekom* (C&W (21%)).

**Poland:** *Centertel* (Ameritech (25%), France Telecom (25%), local Polish PTO); *Polkomtel* (AirTouch (19.25%), Plock (Polish oil refinery, 19.25%), Polska Miedz (Polish state-owned copper producer, 19.25%), Tele Danmark (19.25%), Polskie Sieci (Poland, 11.5%), Weglokoke Stalexport (Poland, 5.5%), Tele-Energo (Poland, 1.0), Telbank (Poland, 0.5%), BIG (Poland, 0.5%)); *Sprint RPTelekom* (Sprint (26%), RP Telekom (Poland, 74%)).

**Romania:** *Telefonica Telemobil* (Telefonica (60%)).

**Russia:** *A/O Telmos* (AT&T (50%), Moscow City Telephone Company (50%)); *Metropolitan Communications* (C&W, Intertelecom (Russian PTO)); *Mobil TeleSystems* (Deutsche Telekom (27%), France Telecom (11%)); *Rosnet International* (AT&T (55%), Rosnet (Russia, 42%), Intercon (US consulting group, 3%)); *St. Petersburg Int'l* (BT (40%), Russian government (60%)); *Moscow Cellular Communications* (US West (22%)); *Rosprint* (Sprint (50%), Central Telegraph (Russia, 50%)); *Sprint Networks* (Sprint (50%), Central Telegraph (Russia, 50%)); *NW GSM* (Telia (25%)); *Delta Telecom* (US West (45%)).

**Ukraine:** *Ukraine Mobile Communications* (Ukrainian PTOs (52%), Deutsche Telekom (16%), KPN (16%), Tele Danmark (16%)); *UTEL* (Deutsche Telekom (17%), AT&T (17%), KPN (17%), Ukrainian Ministry of Communications (51%)).

#### **Africa and the Middle East:**

**Bahrain:** *Batelco* (C&W (20%), Bahrain government (80%)).

**Central African Republic:** *Socatel* (France Telecom (40%), French government (60%)).

**Israel:** *Newtone* (BT (25%), MCI (15%), Darcom (Israel, 20%), Globe-Tel (Israel, 20%), Idan Software (Israel, 20%)); *Bezeq* (C&W (10%), Israeli government (65%), public (25%)); *Pelephone* (Bezeq (50%), Motorola (50%)).

**Ivory Coast:** *Societe Ivorian de Mobiles* (ComAfrique (Ivory Coast, 30%), France Telecom (70%)).

**Namibia:** *Namibia GSM* (Telia (26%)).

**Senegal:** *Sonatel* (France Telecom (34%), Senegal government (66%)).

**South Africa:** *MTN* (C&W (25%), SBC (15.5%), group of South African companies (59.5%)).

**Turkey:** *Teletes* (Deutsche Telekom (20%)); *Turkcell* (Ericsson (Sweden, 15%), Telecom Finland (35%), Turk Telekom (50%)); *Comsat Telecommunications Services* (Comsat (US, 51%), Koc-Unisys (Turkey, 24.5%), Sumitomo (Japan, 24.5%)); *Telsim Mobil Telekomunikasyon Hizmetleri* (Alcatel (France), Detecom (Turkey), Siemens, Teletes (Turkey), Simko (Turkey), Rumeli (Turkey)).

**Yemen:** *YITC* (C&W (51%), Yemen government (49%)); *Tele-Yemen* (GPTC (Yemen), C&W (51%)).



**Africa general:** *Africa ONE* -- 37,000km submarine cable surrounding Africa (ITU, RASCOM (Africa), PATU (Africa), AT&T, Alcatel).

**Asia-Pacific:**

**Australia:** *AAP Telecommunications* (Singapore Telecom (24.5%), AAP (Australia, 51%), Todd New Zealand, 24.5%); *Infolink Network Services* (Singapore Telecom (55%)); *Optus* (BellSouth (24.5%), C&W (24.5%), Australian investors); *Telstra V-Comm* (Telstra), Videsh Saniha Nigam (India)).

**Cambodia:** *Cambodia GSM Limited* (Cambodian Ministry of Posts and Telecomms, Royal Groups of Companies, Millicom International Cellular (UK)).

**China:** *Yunnan & Xha* (AT&T).

**Fiji Islands:** *Fiji International Telecommunications* (C&W (49%), Fiji government (51%)).

**Hong Kong:** *Personal Communications* (BT (20%)); *Hong Kong Telecommunications* (C&W (58%), CITIC (China, 10%), Hutchinson Whampoa (Hong Kong, 32%)); *Honeycomb International* (China Unicom, Hysan (Hong Kong), Tele Danmark, Telenor); *Smartone* (AT&T (30%), ABC Communications (Hong Kong, 15%), Sun Hung Kai (Hong Kong, 40%), Town Khan (China, 15%)).

**French Polynesia:** *Telecoms Ext. de la Polynesie Francaise* (France Telecom (49%)).

**India:** *BPL Systems* (BPL Group (India, 51%), France Telecom (35.5%), LCC (US, 13.5%)); *Wipro BT* (BT (50%), Wipro (India, 50%)); *Birla Communications* (AT&T (49%), Birla Group (India, 51%)); *Mahindra* (BT (40%), Mahindra & Mahindra (India, 60%)); *Max BT* (BT (40%), Max India (60%)); *NYNEX-Reliance Cellular Company* (NYNEX (50%), Reliance (India, 50%)); *India Cellular* (BT (49%)); *Escotel* (Escorts India, First Pacific Company (Hong Kong)); *Hexacom* (Shyam Cellular Infrastructure Projects (India), Telecommunications Consultants (India), Telesystem International Wireless (Canada), Kuwait Mabite Teleco Corp.); *Fascel* (Himaschal Futuristic Communications Ltd., Shinawatra (Thailand), Bezeq, Kotak Mahindra (India)); *Natel D* (Swiss Telecom PTT (30%)).

**Indonesia:** *PT Satelindo* (Deutsche Telekom (25%), PT Birngaraha (Indonesia, 45%), PT Telekom (Indonesia, 22.5%), Indosat (7.5)); *Information Network Services* (Singapore Telecom (100%)); *PT Bukaka Singapore Telecom International* (Singapore Telecom (40%), FIT Bukaka Telekomindo International (Indonesia, 60%), AT&T (20%), KDD (20%), DTAG (Malaysia, 20%)); *PT Pramindo Ikat Nusantara* (PT Astratel Nusantara (Indonesia), France Telecom, two local Indonesian companies).

**Japan:** *Network Information Services* (BT); *International Digital Communications* (C&W (17.6%)); NTT FAN (NTT (Japan, 44%), AT&T, Sony); *AT&T Jens* (AT&T (62.2%), consortium of 22 major Japanese companies including Fujitsu, Hitachi, Industrial Bank of Japan, and KDD (37.8%)); *Tu-ka Cellular* (BT (5%), GTE (US), US West, Nissan (Japan), Motorola); *Globe Telekom* (Ayala (Phillippines, 50%), Singapore Telecom (50%)); *PHS International* (NTT, C&W, Hong Kong Telecom, Itochu (Japan)); *Tu-Ka Chugoku* (GTE (4.5%), AirTouch (4.5%), Nissan (23.75%), Japan Telecom (23.75%), Hoitachi (Japan, 5.5%), West Japan Railways (5.5%), Nippon Steel (Japan, 5.0%), Toyota (Japan, 5.0%)); *Titus Communications* (US West, Toshiba, Itochu, Time Warner Japan).

**Macau:** *Companhia de Telecomunicacoes de Macau* (C&W (51%), Macau government (49%)).



**Malaysia:** *Muitara Telecommunications* (Swiss Telecom PTT (30%), Tan Sri Tan (Malaysia, 70%)); *TRI of Malaysia* (Deutsche Telekom (21%)).

**Maldives:** *Dhivehi Raajjeye Gulhun Private* (C&W (45%), Maldives government (55%)).

**New Caledonia:** *OPT New Caledonia* (France Telecom (49%)).

**New Guinea:** *DGCT* (France Telecom (40%)).

**New Zealand:** *Clear Communications* (BT (25%), MCI (25%), Television New Zealand (25%), TODD (New Zealand, 25%)); *Pacific Star Communications* (Bell Atlantic (49%), Telecom Corp. of New Zealand (51%)); *Telecom New Zealand* (49.9% joint equity ownership by Bell Atlantic and Ameritech)).

**Pakistan:** *Paktel* (C&W (80.7%), Pakistani government (19.3%)).

**Philippines:** *Globe Telekom* (Singapore Telecom (50%)); *Smart Communications* (NTT (15%), First Pacific (Hong Kong, 14%), Metro Pacific (Philippines, 14%), Vea-Fernando Group (Philippines, 57%); ETPI (C&W (40%)).

**Singapore:** *MobileOne* (Keppel Group, Singapore Press Holdings, C&W, Hong Kong Telecom).

**South Korea:** *Shinsegi Mobile Communications* (SBC (8.3%), Pohang Iron & Steel (South Korea, 15%), Kolon (South Korea, 15%), Qualcomm (2%), consortium of Korean investors (59.7)).

**Sri Lanka:** *Lanka Cellular Services* (Singapore Telecom (76%)); *Lanka Communications Services* (Singapore Telecom (52%)).

**Thailand:** *TelecomAsia* (NYNEX and local Thai PTO)); *TT&T* (NTT (18.5%), local Thai PTO (81.5%)).

**Vanuatu:** *Vanitel* (France Telecom (33%), Vanuatu government (67%)); *Vanitel Cellular* (France Telecom (33%)); *Telecom Vanuatu* (C&W (100%)).

**Asia-Pacific Region:** *Asean Telecom Holding* (Communications Authority of Thailand (20%), Philippines Long Distance Telephone Company (20%), PT Indosat (Indonesia, 20%), Singapore Telecom (20%), Telecom Malaysia (20%)); *Asiasat* (C&W, Hutchinson Whampoa (Hong Kong), Chinese investment company)); *Jupiter Telecommunications* (Sumitomo (37.5%), TCI (US, 32.5%), Japanese TV Networks (30%)).

### The Americas:

**Argentina:** *Telecom Argentina* (France Telecom (19.5%), J.P. Morgan (US), Perez Company (Argentina), STET (19.5)); *Telefonica de Argentina* (Telefonica (22%), Citicorp (US), Techint (Argentina)); *Movistar* (France Telecom (10%), Telefonica (10%)); *Sprint Movil* (Sprint (51%)); *Compania de Telefonos de Interior* (AT&T (10%)).

**Barbados:** *Barbados External Telecommunications* (C&W (85%), Barbados government (15%)).

**Belize:** *Belize Telecom* (MCI (23.5%)).

**Bolivia:** *Entel* (Bolivian government (50%), STET (50%)).

**Canada:** *British Columbia Telephone* (GTE (100%)); *Quebec Telephone* (GTE (100%)); *Sprint Communications Canada* (Sprint (100%)); *Unitel* (AT&T (33%), Bank of Nova Scotia (Canada, 28%), Royal Bank of Canada (16%), Toronto Dominion Bank (Canada, 23%)); *WorldLink Telecom* (Infonet consortium, Bell Canada).

**Chile:** *CTC* (Telefonica (43.6%)); *VTR Inversiones* (Grupo Luksic (Chile, 51%), SBC (40%), Siemens (9%)); *Entel* (Chilquinta (Chile, 18%), Private Pension Funds (Chile, 46%), Samsung (Korea, 16%) STET (20%)); *CTC Cellular* (Telefonica (44%)).

**Colombia:** *Cocolo* (Telefonica (22%)); *Cellumovil* (AT&T (35%), Grupo Santo Domingo (Colombia), LCC, Nothingham Holdings (US)); *Cellumovil de la Costa* (AT&T (10%)); *Occel* (C&W (22.3%)); *Codelco* (Telefonica (31%)).

**Cuba:** *Etecsa* (Cuban government (51%), Grupo Domos (Mexico, 37%), STET (12.5%)).

**Dominican Republic:** *Codetel* (GTE (100%)).

**Ecuador:** *Otecel* (AT&T).

**Grenada:** *Grenada Telecommunications* (C&W (70%), Grenada government (30%)).

**Jamaica:** *Jamaica Digiport* (AT&T (35%), Jamaican government (65%)); *Telecommunications of Jamaica* (C&W (79%), Jamaican government (21%)).

**Mexico:** *Telmex* (equity investments by France Telecom (5%), Grupo Carso (Mexico, 10.4%), SBC (5%)); *Alestra* (AT&T (20%), Grupo Alfa (Mexico, 25.6%), Grupo Bancomer (Mexico, 24.4%), GTE (14.5%), Telefonica (14.5%)); *Avantel* (MCI (49%), Grupo Financiero Banamex Accival (Mexico, 51%)); *Iusacel* (Bell Atlantic (49%), Grupo Iusacel (Mexico, 51%)); *Telcel* (France Telecom, Telmex (Mexico)); *Movitel de Noroeste* (AT&T (22%)); *Radiomovil* (France Telecom).

**Peru:** *Telefonica del Peru* (Peruvian government (7.7%), Telefonica (35%));

**Puerto Rico:** *Telephonica Larga Distancia de Puerto Rico* (Telefonica (80%)); *AT&T Puerto Rico* (AT&T (100%)).

**United States:** *MCI* (BT (20%)); *Nextel Communications* (NTT (0.9%), Bank of Tokyo, Matsushita (Japan)); *Nextwave* (NTT (2%), Philadelphia Power (US), Qualcomm, Sony); *Sprint* (Deutsche Telekom (10%), France Telecom (10%)); *C&W Inc.* (C&W (100%)); *AskyB* (MCI, Newscorp (UK)).

**Uruguay:** *Teco Tasa* (France Telecom, Telecom Argentina, Telefonica (10%)).

**Venezuela:** *CANTV* (40% equity investment by a consortium comprising Banco Mercantil Group Caracas (Venezuela, 12%), Electricidad de Caracas (Venezuela, 16%), GTE (51%), Lucent (US, 5%), Telefonica (16%)); *MCI de Venezuela* (MCI (100%)).

**America general:** *Optel Communications* (Teleglobe (20%), US private investors (80%)); *Canus 1* -- linking US and Canada and linked to Europe by transatlantic a cable (Optel Communications (US, 50%), Teleglobe (50%)); *MCI-Stentor* (MCI (Canada)).

