

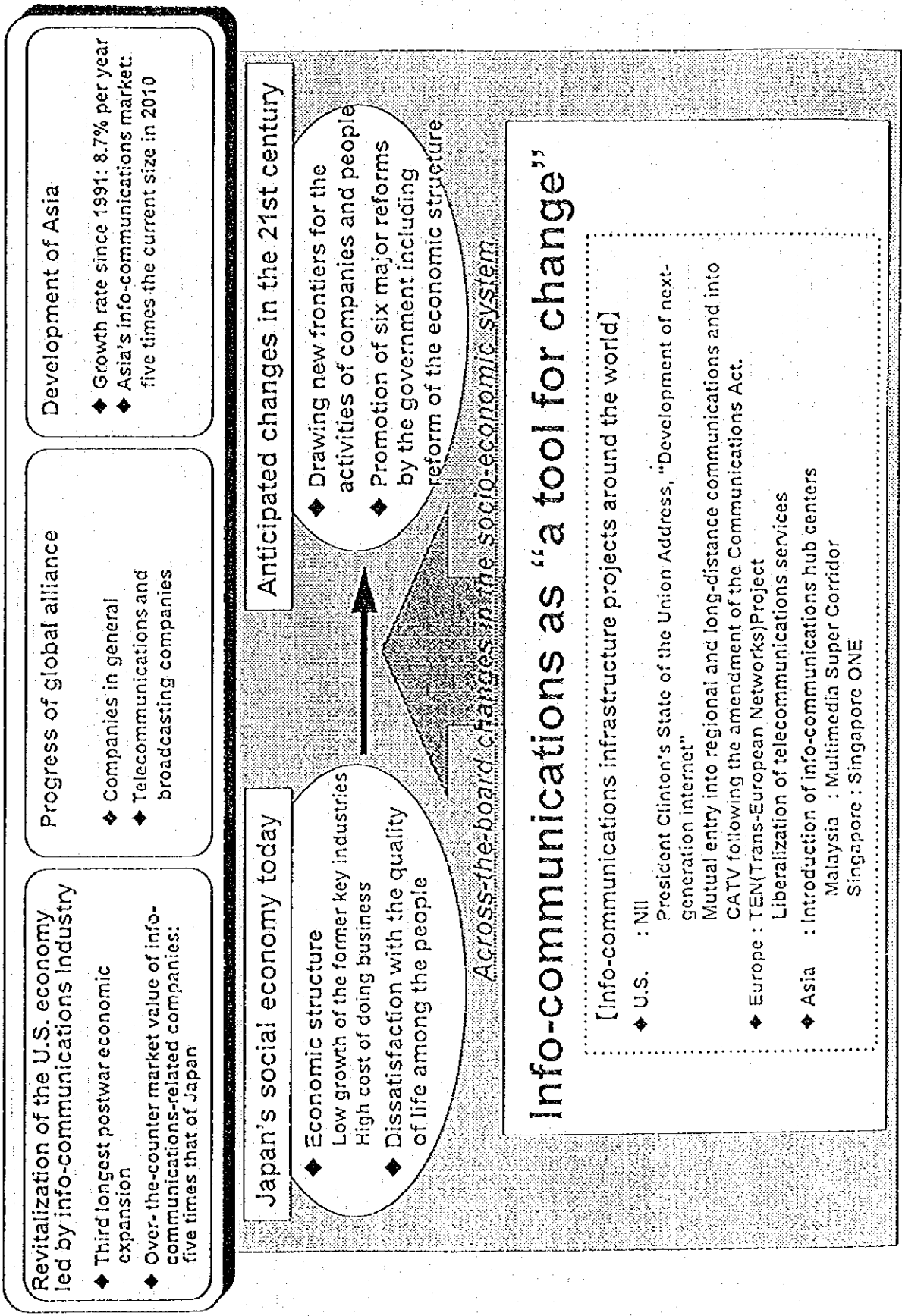
Unofficial translation

**VISION 21 FOR INFO-COMMUNICATIONS
(SUMMARY)**

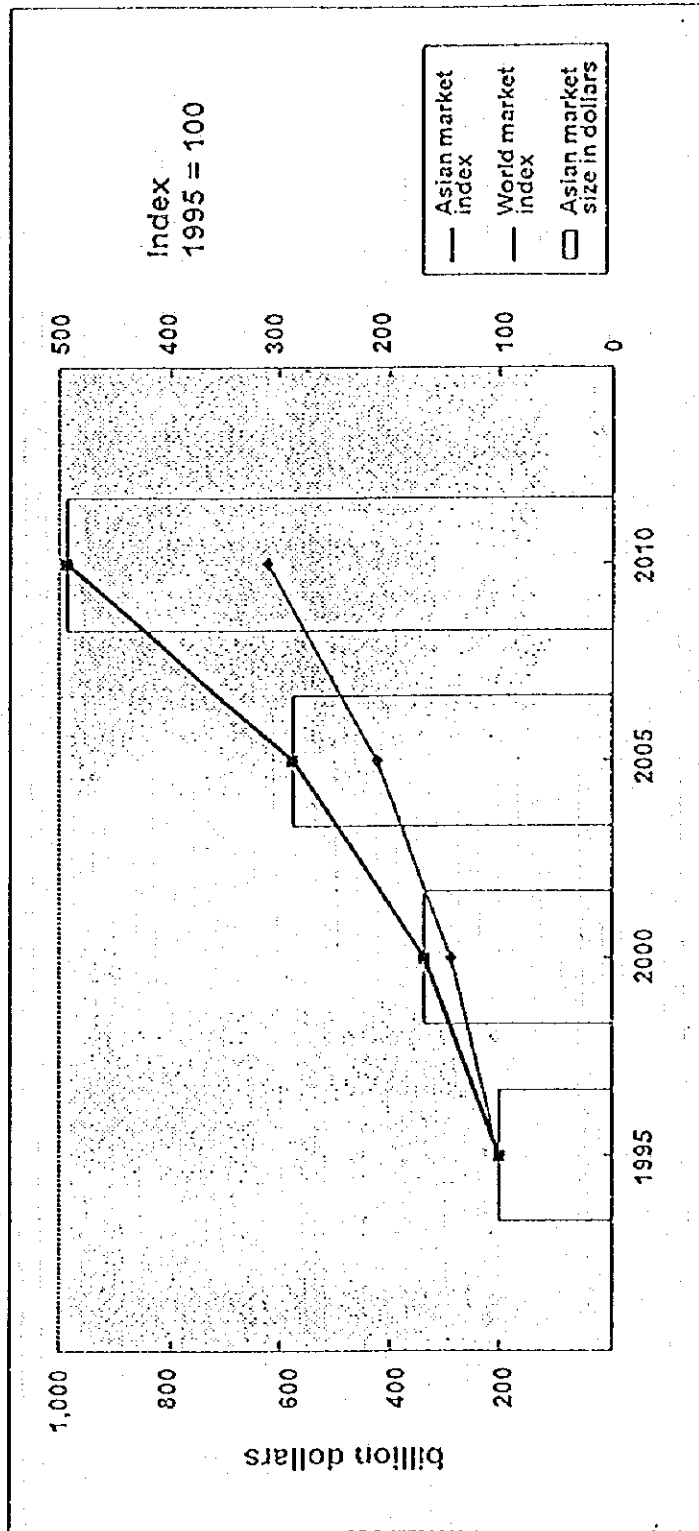
TELECOMMUNICATIONS COUNCIL

(JUNE 17, 1997)

CHAPTER 1 ROLE OF INFO-COMMUNICATIONS IN AN AGE OF MEGA-COMPETITION



Size of Asia's info-communications market



	1995	2000	2005	2010
World market (billion dollars)	1,825	2,645	3,874	5,663
Asian market (billion dollars)	200	338	578	987
World market index	100	145	212	310
Asian market index	100	169	289	493

Note : Asia comprises Korea, China, Taiwan, Hong kong, Singapore, Malaysia, Thailand, Vietnam, Myanmar, Philippines, Indonesia, India, Australia and New Zealand.

CHAPTER 2 COMPREHENSIVE POLICY MEASURES

1. THE ROLE OF THE INFO-COMMUNICATIONS ADMINISTRATION: FIVE PRINCIPLES

PRESENTATION OF A CLEAR VISION

DEVELOPMENT OF INFO-COMMUNICATIONS INFRASTRUCTURE

- Private sector-led
- Improvement of the regulatory systems
- Public sector leadership
- Promotion of R&D

PROMOTION OF DYNAMIC COMPETITION

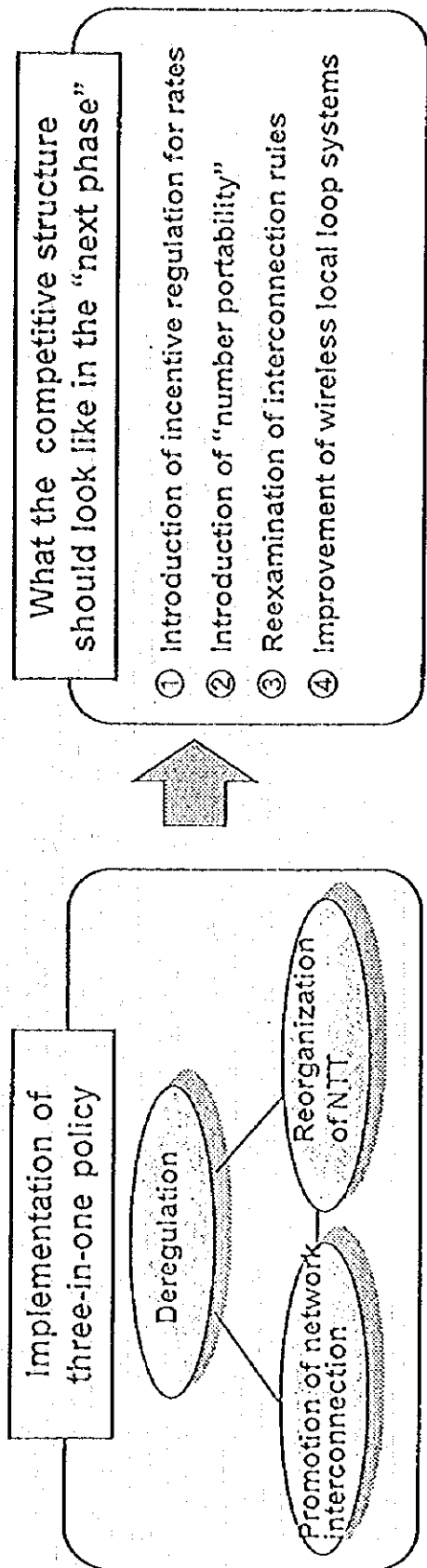
ENSURING SOCIAL FAIRNESS

GLOBAL VIEWPOINT

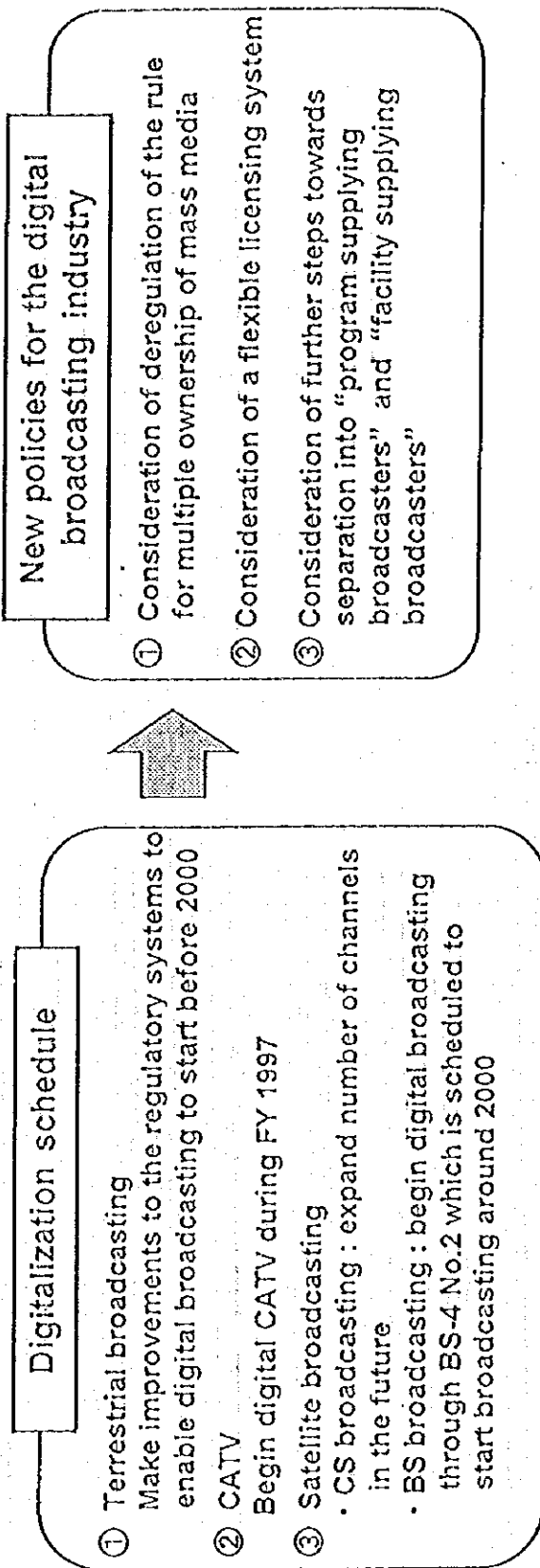
- Playing a leading role in liberalizing the info-communications market
- Development of global info-communications infrastructure

2. PROMOTION OF "SECONDARY INFO-COMMUNICATIONS REFORM"

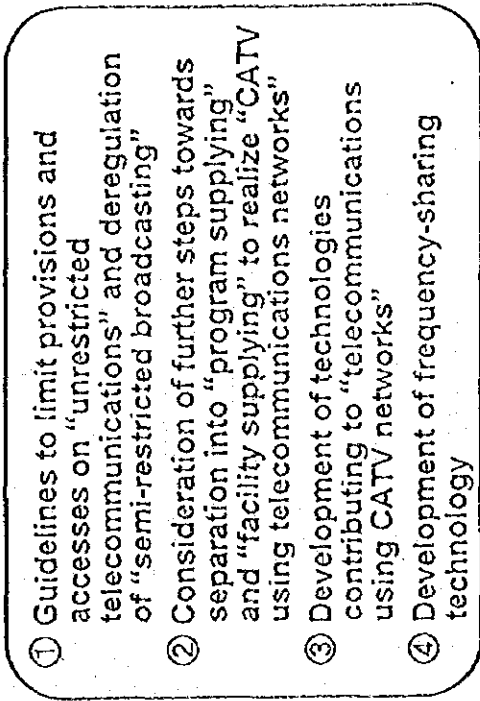
(1) TELECOMMUNICATIONS MARKET REFORM



(2) BROADCASTING REVOLUTION THROUGH DIGITALIZATION

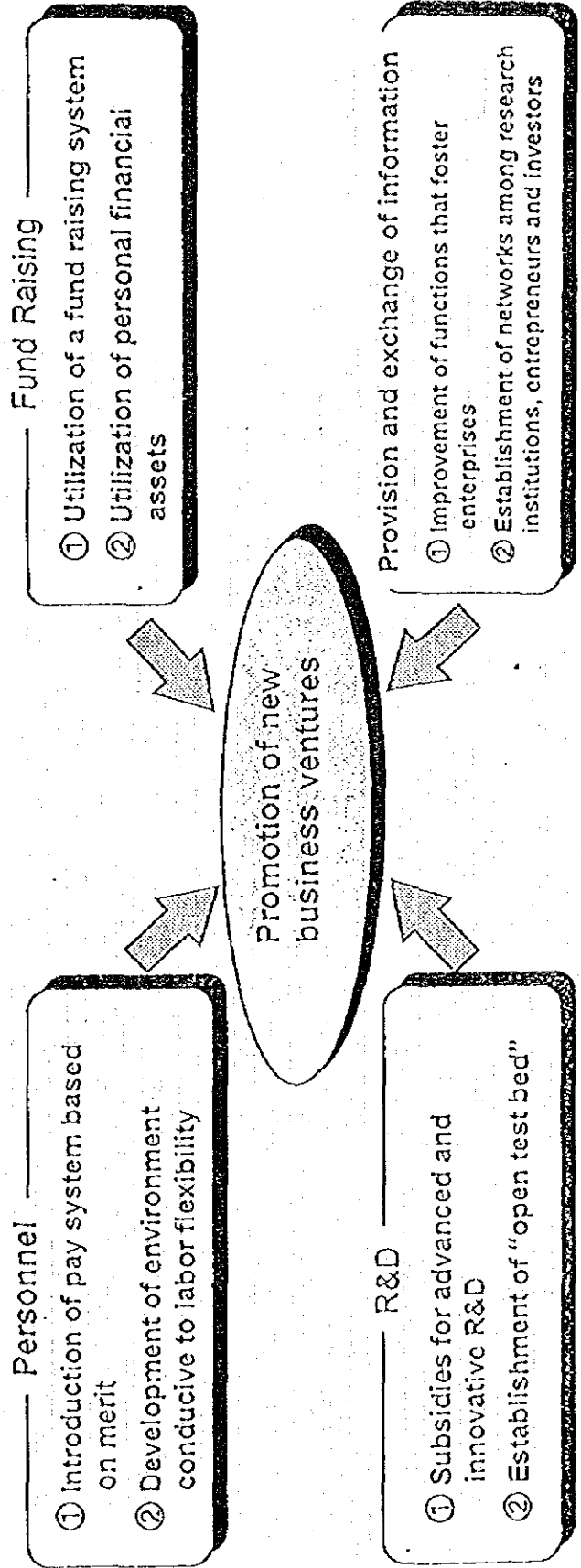


(3) CONVERGENCE OF TELECOMMUNICATIONS AND BROADCASTING

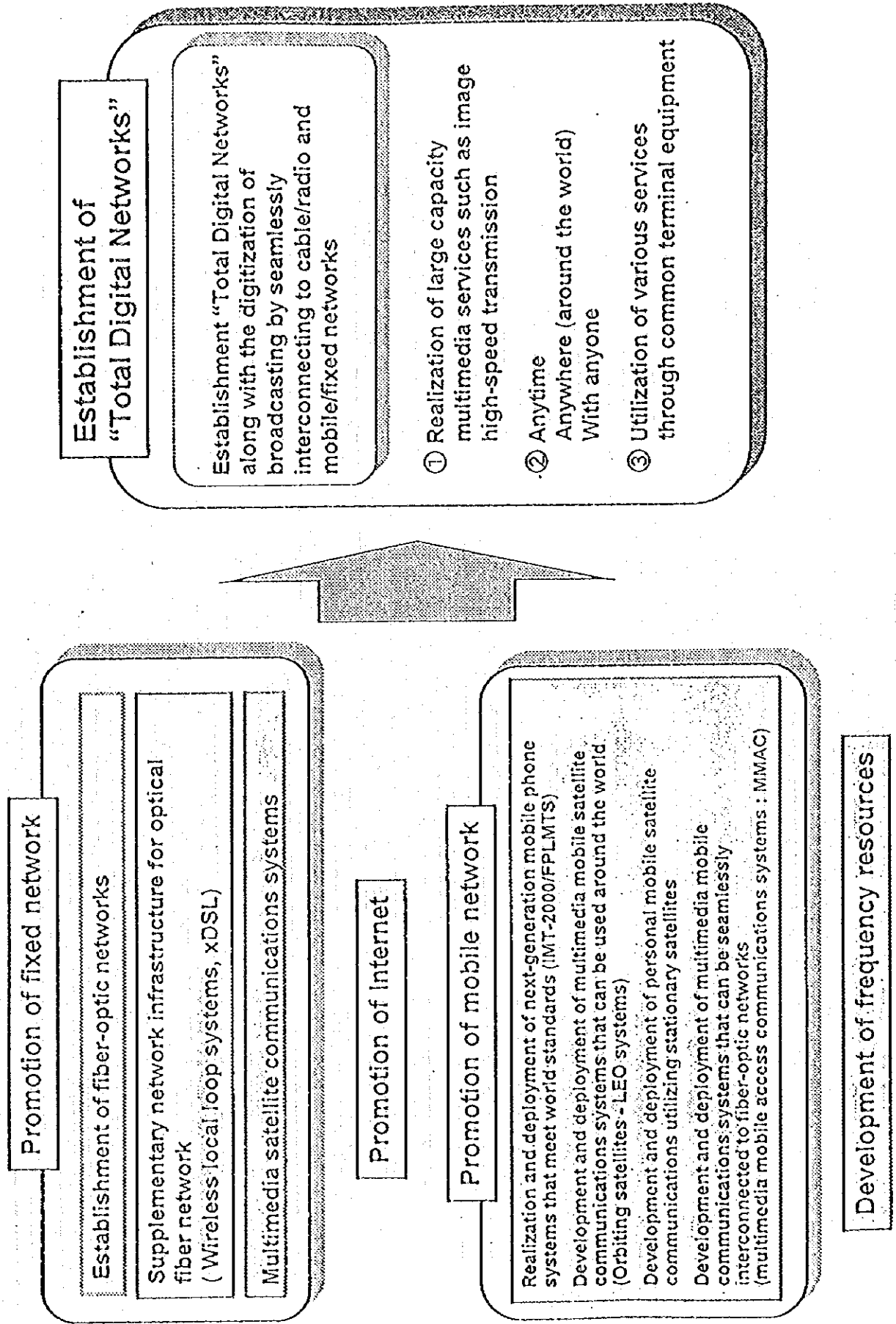


* VICS = Vehicle Information and Communication System

(4) Promotion of new businesses

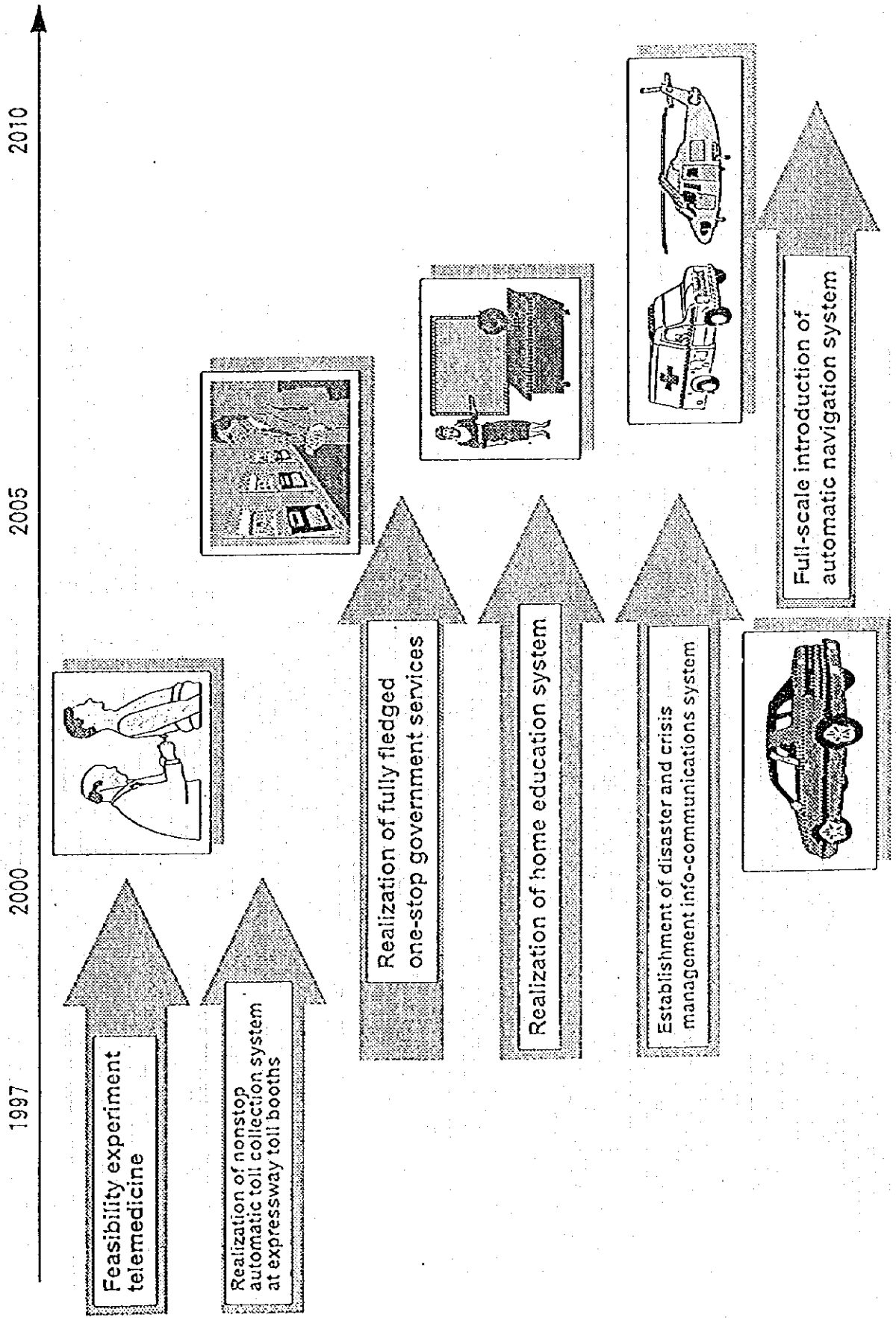


3. DEVELOPMENT OF NETWORK INFRASTRUCTURE



4. DEVELOPMENT OF APPLICATIONS AND DEPLOYMENT

Schedule for application realization -- Promotion through across-the-board cooperation among government agencies --



5. PROMOTION OF CREATIVE R&D

(1) Expansion of the scope of R&D

(a) Priority R&D projects

Establishment of advanced network infrastructure

- ① Establishment of advanced fiber-optic communications infrastructure
- ② Permitting multimedia use at any time, anywhere with anybody
- ③ Realization of global communications system that can be used anywhere in the world
- ④ Establishment of high-performance and highly reliable networks and realization of their sophisticated applications
- ⑤ Realization of sophisticated image application -- the centerpiece of next-generation broadcasting services and multimedia
- ⑥ Realization of user-friendly and easy-to-use info-communications systems

Development of diverse and convenient applications and content

(b) R&D of basic interdisciplinary fields

Search for seeds of new info-communications technologies

(2) Development of research system

- ① cooperation between researchers throughout the world
in business, academia and government as well as other fields
- ② Implementation of outside assessment
- ③ Expansion of international collaborative research grants
- ④ R&D projects proposed by local areas

(3) Promotion of standardization

- ① Consolidation of private standardization group functions
- ② Establishment of Asia-Pacific Telecommunications Standardization Institute (ATSI)
- ③ Establishment of R&D system which stimulates the creation of standards
- ④ Establishment of open test bed technology development and standardization

6. PROMOTION OF GLOBALIZATION

Promotion of liberalization

Playing a leadership role in liberalizing telecommunication markets

Development of global info-communications infrastructure

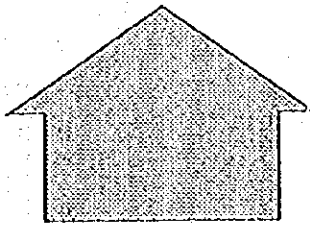
- ① Support for the establishment of info-communications infrastructure in developing countries
- ② Fourfold increase in the telephone ownership rate in developing countries
- ③ Establishment of "Open Air University" in the Asia-Pacific region to increase the number of technicians in the info-communications field

Establishment of info-communications hub

7. REGULATORY MEASURES TO SOLVE NEW SOCIAL PROBLEMS IN A SOPHISTICATED INFO-COMMUNICATIONS SOCIETY

Emergence of new social problems

- ① Social problems stemming from emergence of new forms of information distribution
- ② Security problems
- ③ Increase in "space debris"
- ④ Electro-magnetic environmental problems
- ⑤ Employment problems
- ⑥ Emergence of information disparities
- ⑦ "Information literacy"

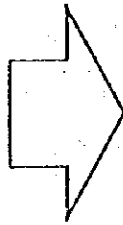


Review of relevant regulatory systems

Further consolidation of efforts by government agencies

"Cyber Law"

The overall reexamination of existing regulatory systems is indispensable in establishing an environment that can take advantage of a sophisticated info-communications society.

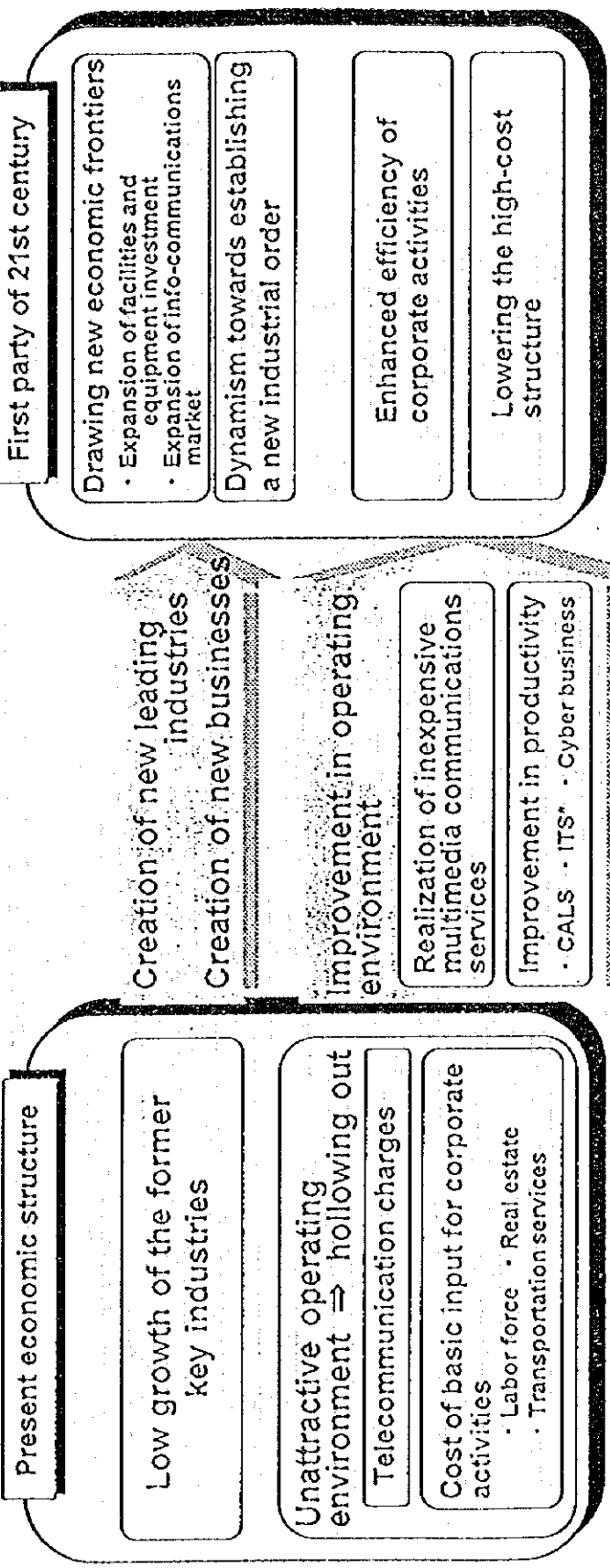


It is essential to study the feasibility of a "Cyber Law" for the purpose of promoting electronic commerce (EC), protecting privacy and so on.

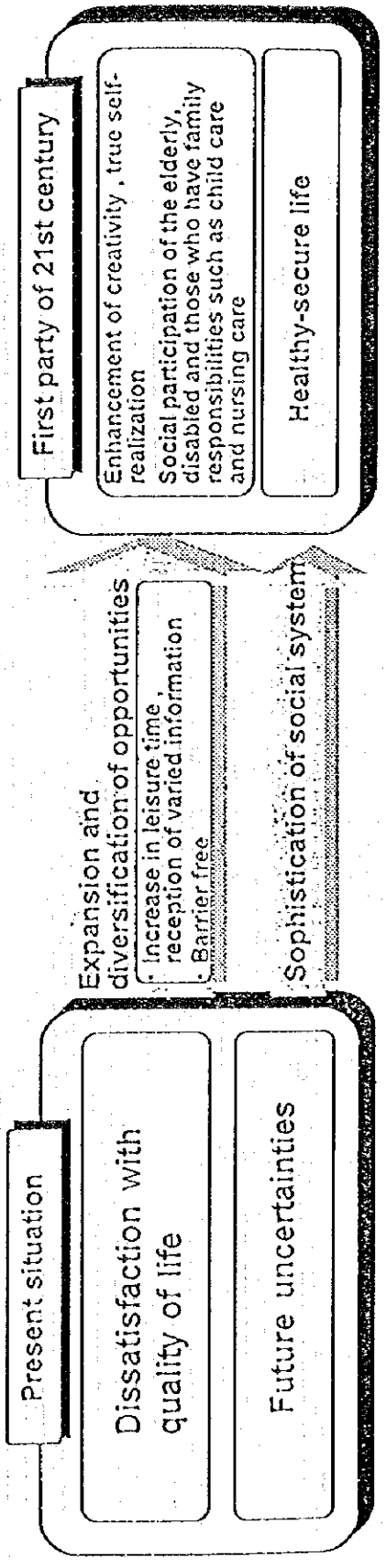
CHAPTER 3 FUTURE OUTLOOK FOR FIRST PART OF 21ST CENTURY

1. DIRECTION

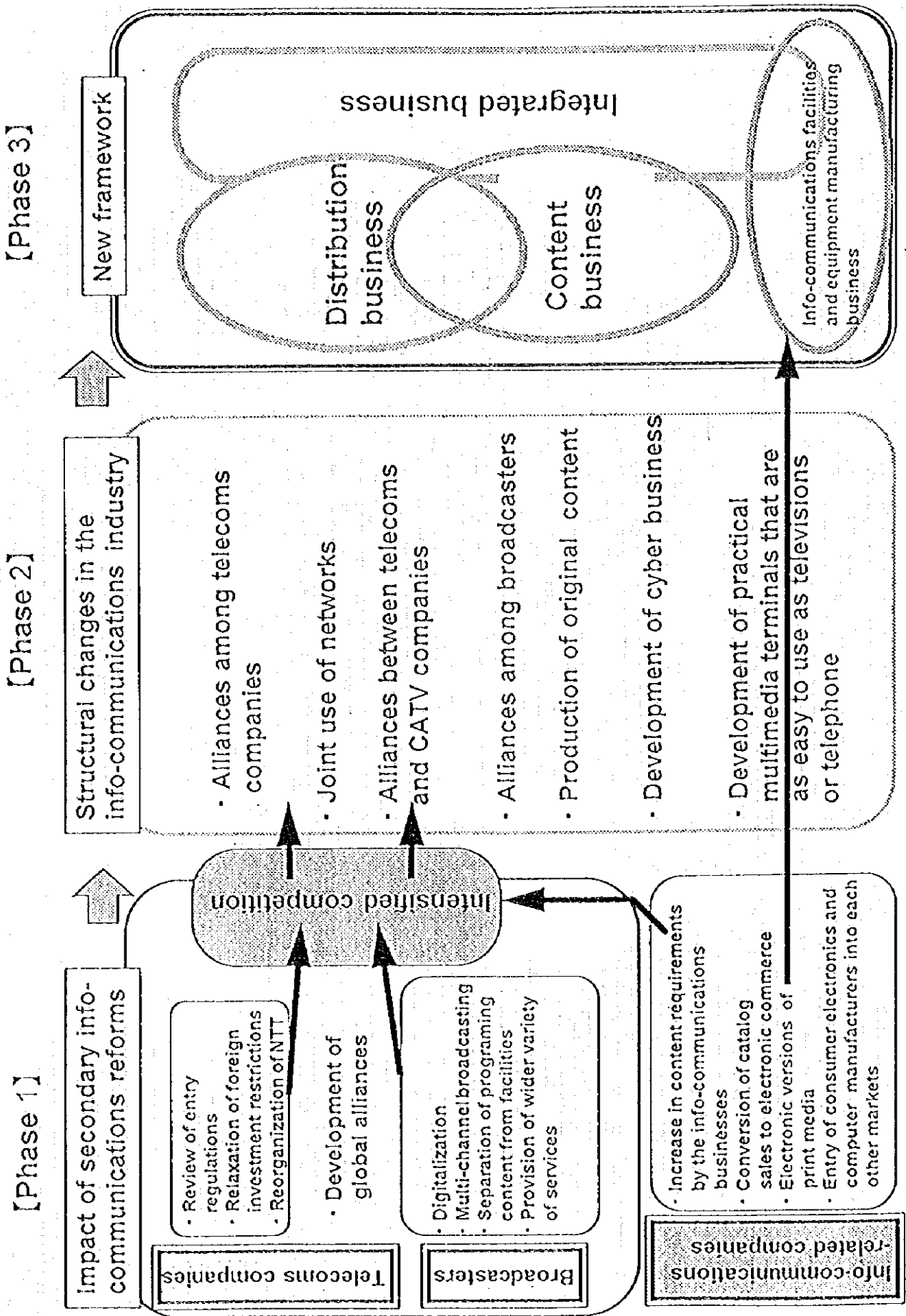
Industrial economy



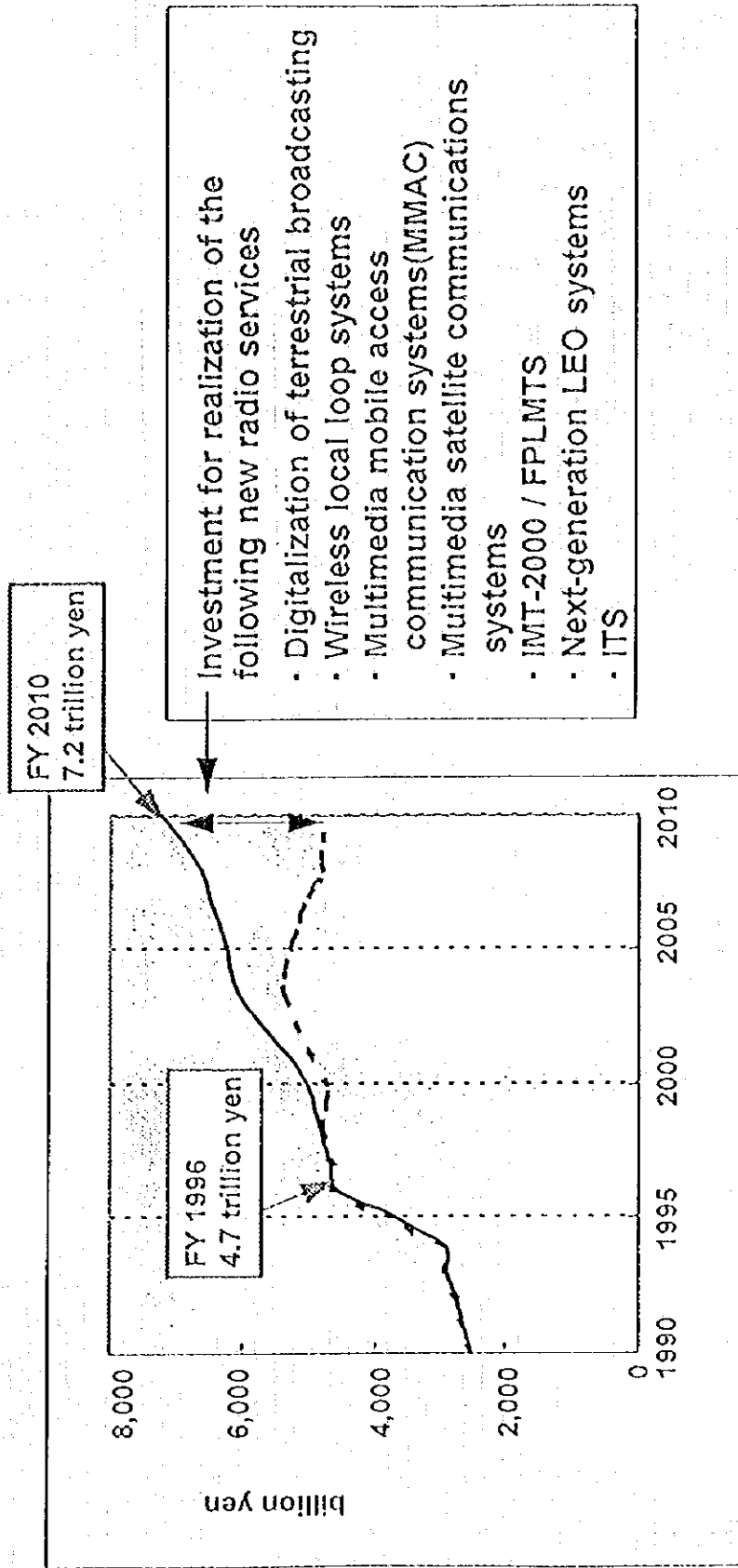
People's life



2. Trends in the info-communications industry



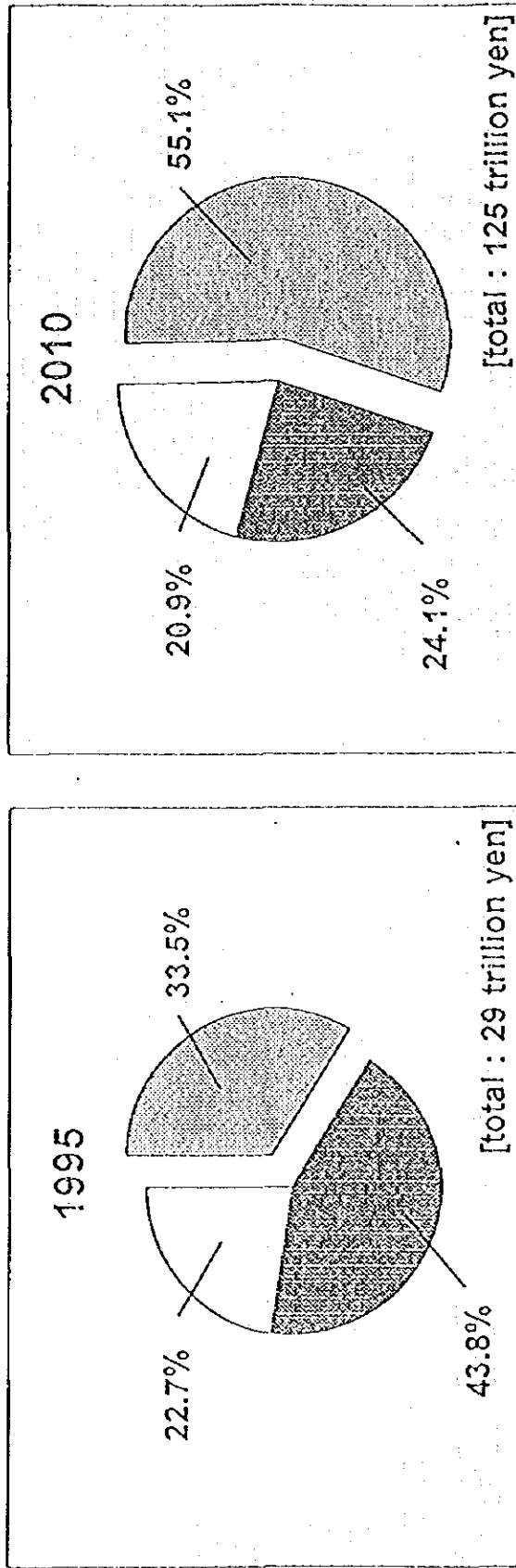
3. FACILITIES AND EQUIPMENT INVESTMENT BY THE COMMUNICATIONS AND BROADCASTING INDUSTRY



(Unit : billion yen)

Item	1990	1995	2000	2005	2010
Facilities and equipment investment by communications and broadcasting industry	2,682	3,807	5,028	6,233	7,214
Investment for realization of the new radio services (included in the above)	0	0	325	926	2,416

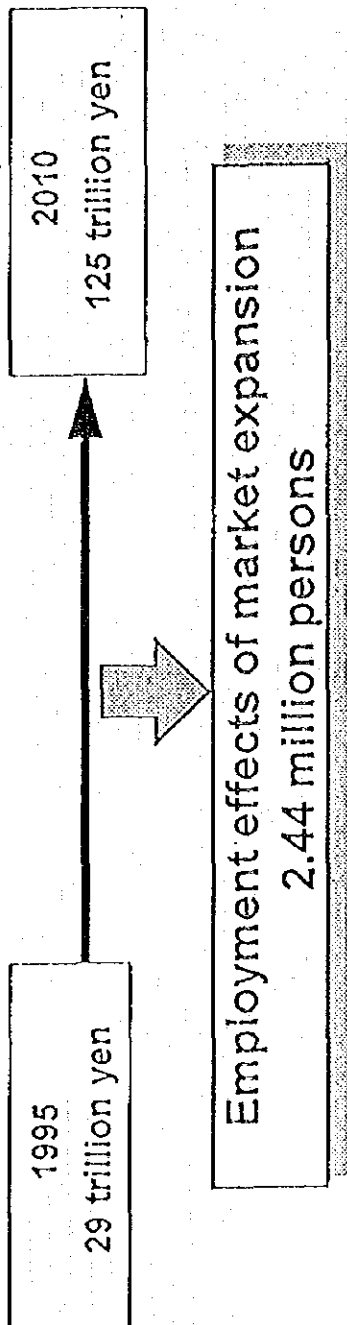
4. STRUCTURE OF THE INFO-COMMUNICATIONS MARKET



- Content : information services provided via networks
- ▒ Distribution : services provided by network infrastructure (telecommunications, broadcasting)
- Platform : terminal equipment, etc..

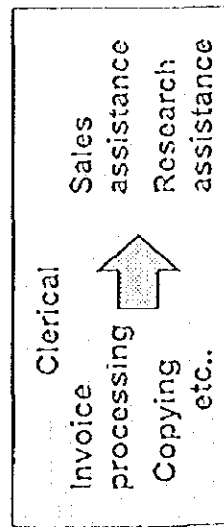
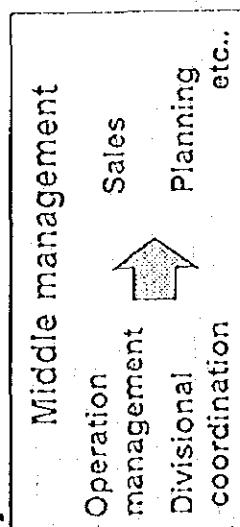
5. EFFECTS OF INFO-COMMUNICATIONS ON EMPLOYMENT

① Effects of expansion of the info-communications market on employment



② Changes in employment structure due to investment in info-communications systems over the next 5 years

Changes in the nature of jobs



Changes in personal allocations

(Figures represent the percentage of responding companies)

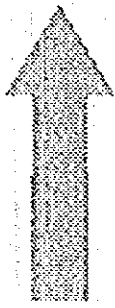
Job	Past to present			Present to future		
	Increase	No change	Decrease	Increase	No change	Decrease
Executive	7	82	11	4	85	11
Middle management	10	60	30	2	48	50
Clerical	5	36	59	3	33	64
Research/Engineering	24	57	19	40	50	10
Sales	16	68	16	39	51	10
Production, Transportation, Technical	4	56	40	8	61	31

(Based on surveys conducted by the MPT)

6. LEVEL OF MULTIMEDIA COMMUNICATION CHARGES IN 2010

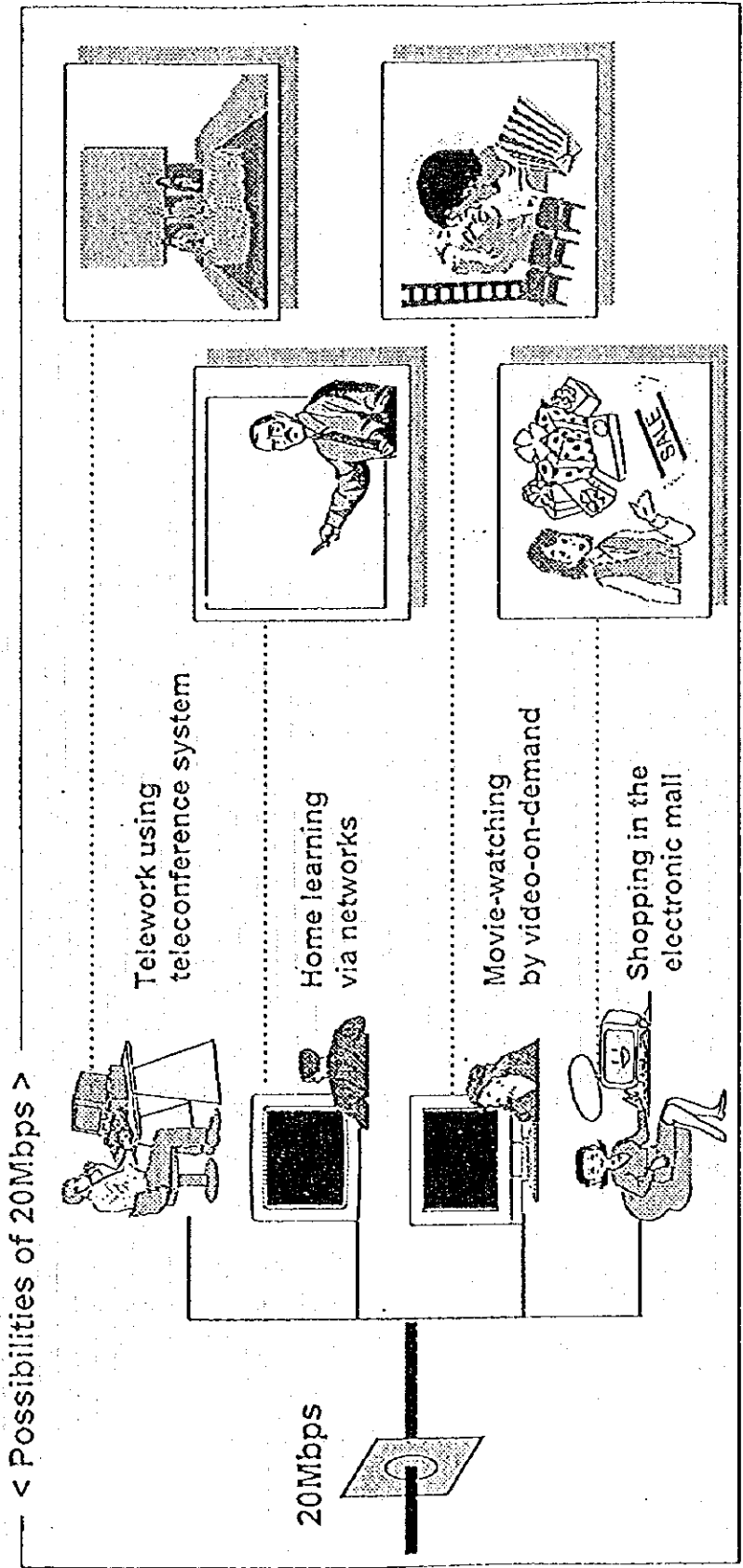
<Present>

Average spending on telecommunications services per household
7,400 yen per month
(excluding mobile phone charges)



<2010>

20Mbps circuit
7,800 yen per month
(domestic flat charge)



7. EFFECTS ON INDUSTRIAL ECONOMY AND PEOPLE'S LIFE

Industrial economy

【 Manufacturing 】
The introduction of CALS will reduce the time required and analysis of customer information.



【 Marketing and distribution 】
POS will increase the efficiency of collection and analysis of customer information.

The introduction of cyber business will cut about 90,000 yen off the average monthly office rent of 510,000 yen.

Development of practical automated toll collection systems for expressways will relieve toll-booth congestion, which accounts for about 35% of total congestion.

【 Construction 】
Remote construction systems will reduce labor accidents.

【 Finance 】
Settlement loan, and the development and sale of new financial products will be widely conducted without the intervention of existing financial institutions through the use of electronic money.

Enhanced efficiency of corporate activities

Creation of dynamism

People's life

【 Consumption lifestyle 】
Cyber shopping will cut shopping time.

【 Education 】
On-demand systems will result in an increase the number of home students.

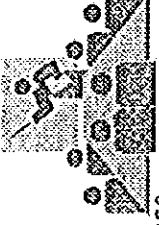

【 Medical care 】
IC card systems will cut :
Out-patient costs by 14-50%
in-patient costs by 13-35%

Remote treatment systems will make it possible to provide specific diagnosis even on remote islands or in other isolated locations.

【 Labor 】
Telework will increase job opportunities while reducing by about 8.4% the congestion in the Tokyo-area commuter trains.

【 Community activities 】
Those who cannot attend gatherings in person can exchange information on hobbies and tastes in virtual communities.

【 Environment 】
ITS and telework will reduce the environmental load.

Secure-Quality life

Increased use of brain rather than brawn

High Capacity Optical Fiber Submarine Cable Technique and Global Communication System for Multimedia Era beyond 2000

Feb. 1998

Japan International Cooperation Agency
(JICA)

Y. ITO

Introducing New Technique

- I. Optical Fiber Submarine Cable
- II. Global Mobile Communication System
- III. CDMA

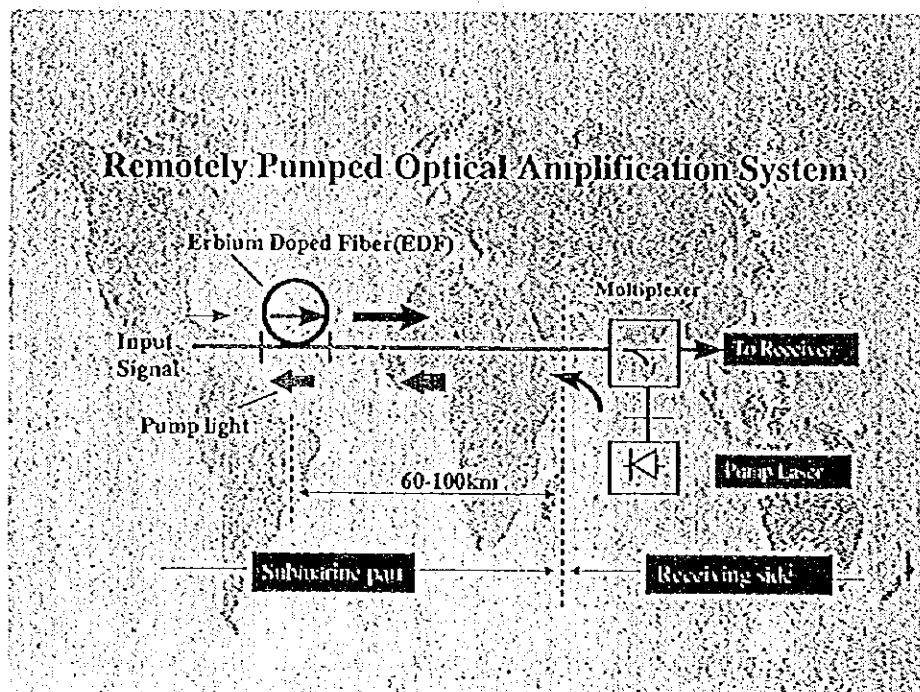
Optical Fiber Submarine Cable

KDD Submarine Cable System

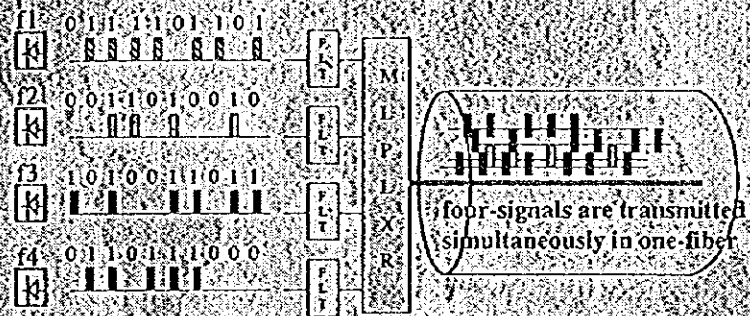
Submarine Cable System	OS-280M	OS-560M	OS-A
Transmission Speed	280Mbit/s	560Mbit/s	5Gbit/s
Capacity per fiber Pair	3,780 circuits	7,560 circuits	60,480 circuits
Repeater type	Regenerator	Regenerator	Optical Amplifier
Wavelength	1.31 μ m	1.55 μ m	1.55 μ m
Repeater Spacing	60-70 km	120-150 km	30-100 km
Implementation System	TPC-3	TPC-4	TPC-5CN
In-service Date	1989	1992	1995-1996

New Optical Submarine Cable Techniques

- ◆ Amplify Directly (Optical Signal) (without converting into electrical Signal) by remote pumping system
- ◆ WDM (Wavelength-Division Multiplexed) Lightwave Communication System
- ◆ Optical Soliton Technology




Basic Diagram of Wavelength-Division Multiplex



Optical Soliton Technology

- ◆ Light-wave degradation in fiber
 - Dispersion
 - Non-linearity $\lambda_1, \lambda_2, (2\lambda_1 - \lambda_2)$ or $(2\lambda_2 - \lambda_1)$
- ◆ Refractive index increases by strength of light, then Light travel more slowly (non-linearity)
- ◆ Selecting optimum width & form of pulse, dispersion is suppressed by non-linearity



II. Global Mobile Communication System



Satellite Communication System

- ◆ Fixed Satellite Comm. Services

- ✦ Intelsat = Large Volume & TV

- ◆ Mobile Satellite Comm. Services

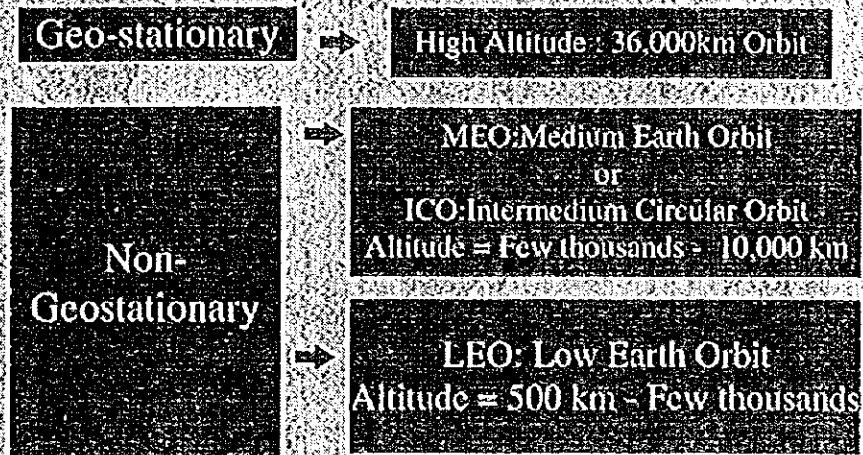
- ✦ Geo-Stationary Satellite

- Inmarsat (Maritime comm. GMDSS)

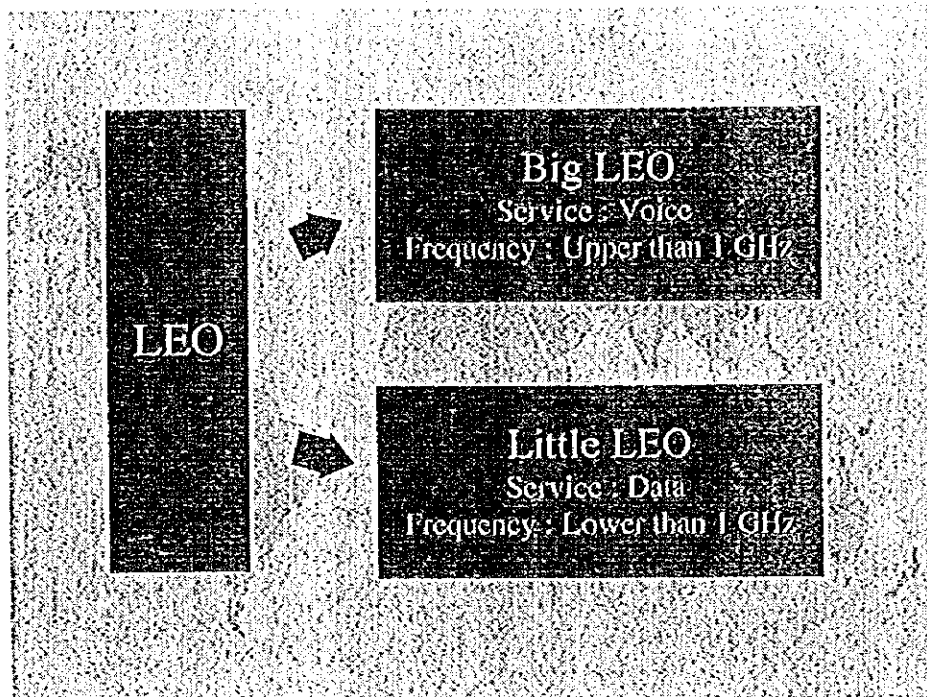
- ✦ Non-Geostationary Satellite System :

- Personal Communications

Mobile Satellite System



	GEO	MEO	LEO
Height (km)	36,000	few thousands - 10,000	1,000 - few thousands
Size of Satellite	big (1,500-2,000kg)	medium (900-1,500kg)	small (300-800kg)
Coverage by one satellite	broad (stationary)	medium (2 hours)	narrow (12 minutes)
Number of Satellite	4	10-15	40-70
Number of Spot Beam	100-200	50-100	40-70
Period	long (24 hours)	medium (approx. 6 hours)	short (approx. 2 hours)
Propagation Loss	large (188 db)	medium (177db)	small (157 db)
Propagation Delay	long (240 ms)	medium (67 ms)	short (7 ms)
Commercial Example	INMARSAT N-STAR	ICO ODYSSEY	IRIDIUM GLOBALSTAR



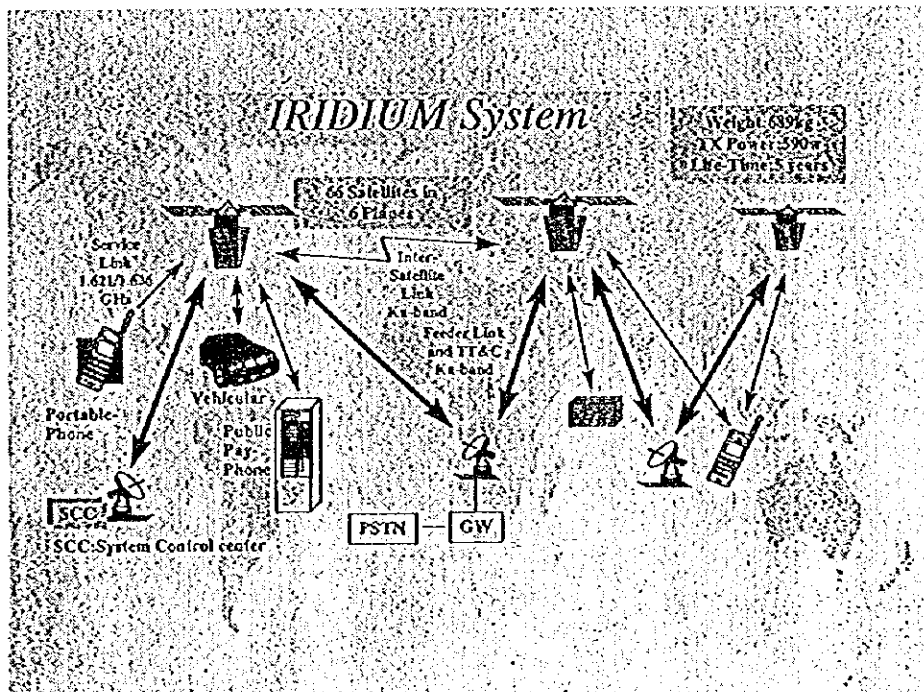
Little LEO Systems

System	VITASAT	ORBCOMM		STARNET	LEOSAT
System Provider	Volunteers In Technical Assistance	Orbital Comm Corp		StarSys Corp	LEOSAT Inc
Altitude (km)	657	775		1,300	970
Number of Satellites	2	35	2	24	18
Orbital Planes	1	4	1	24	3
Multiple Access	FDMA	FDMA/TDMA		CDMA	-
Service in	1986	1995		-	1997
System Cost (US\$ Billion)	0.2	1.4		2.0	1.0

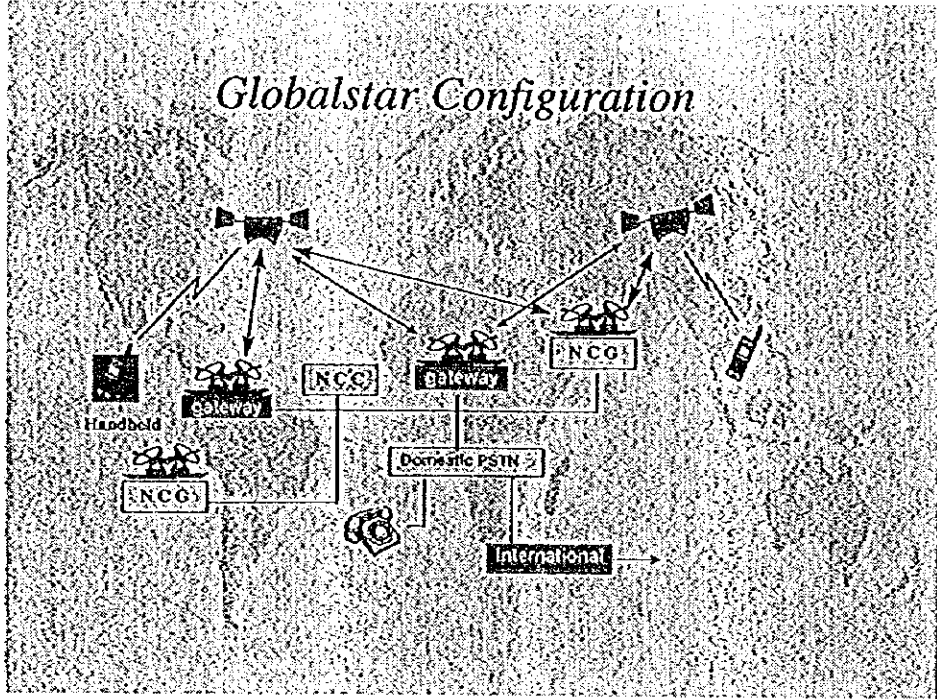
* Trial system

Big LEO/MEO Systems

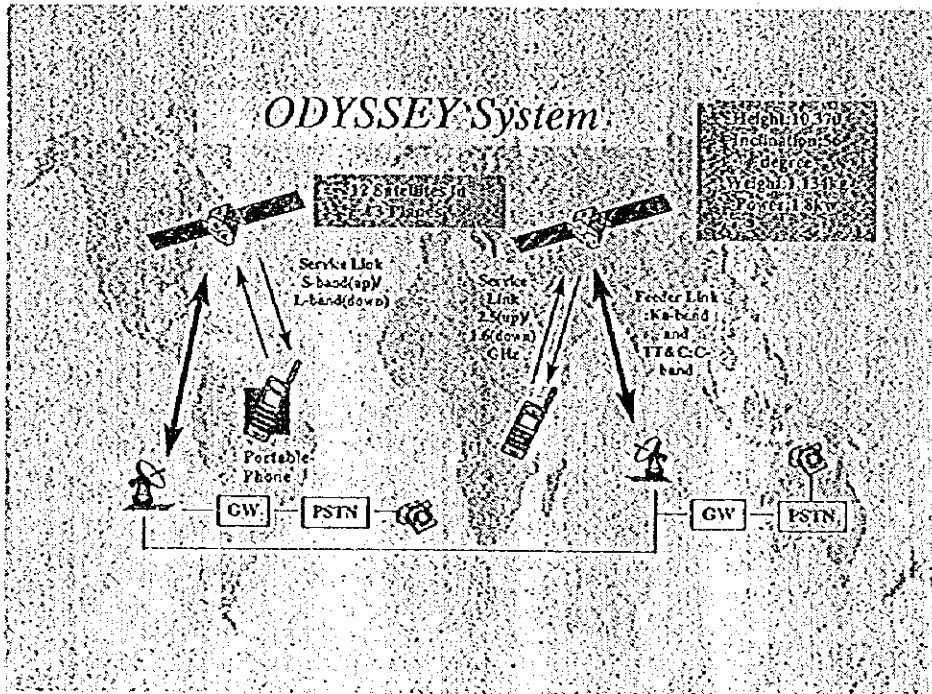
System	IRIDIUM	GLOBAL STAR	ODYSSEY	ICO
Provider	Iridium Inc.	Loral QualComm Sat. Svcs Inc.	TRW Inc.	ICO Inc.
Orbit Type	LEO	LEO	ICO	ICO
Altitude	780 km	1,389 km	10,354 km	10,355 km
No. of Sats	66	48	12	10 (+2 spare)
Orbital plane	6	8	3	2
Multi-Access	TDMA	CDMA	CDMA	TDMA
Term Cost	\$2,000	\$500-700	\$250-350	\$500-1,000
Circuit/Sats	1:100	As 3:000	3,000-9,500	4,500
InterSat-link	Yes	NO	No	No
In-service	1998	1998/1999	2000	1999/2000



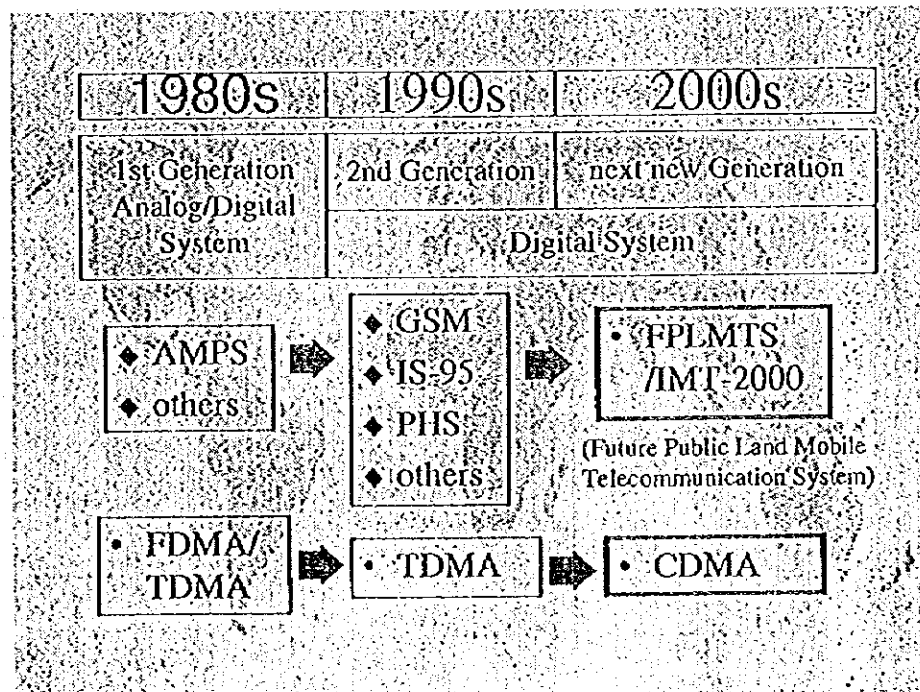
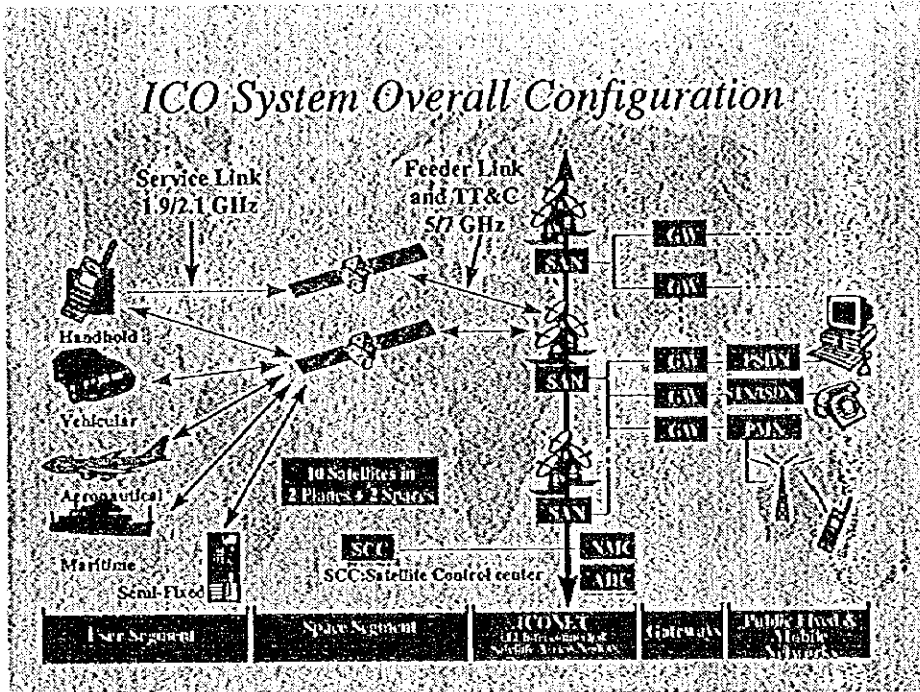
Globalstar Configuration



ODYSSEY System



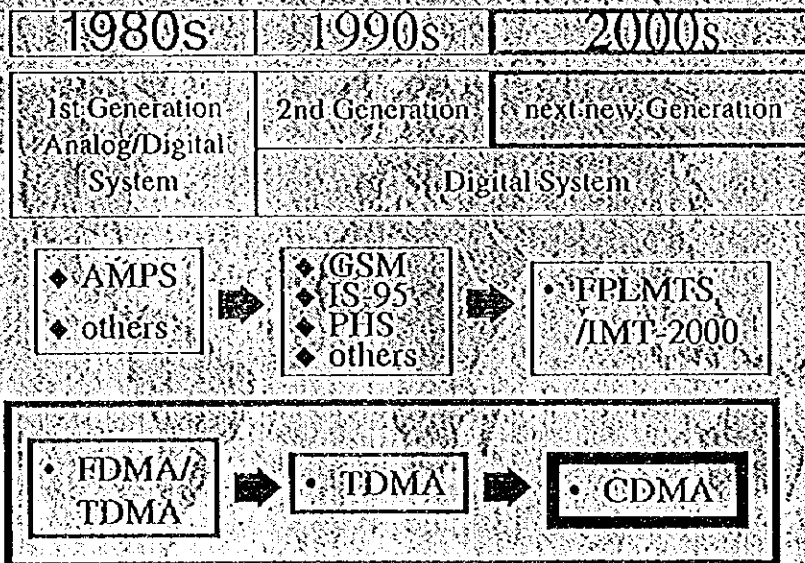
ICO System Overall Configuration



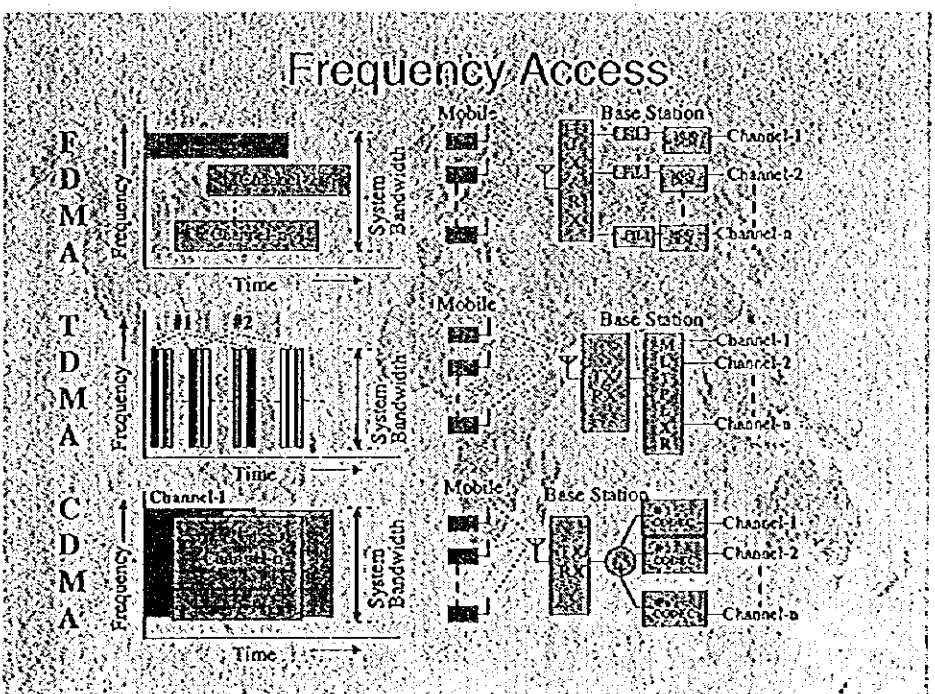
General Concept of FPLMTS/IMT-2000

(International Mobile Telecommunications 2000)

- ◆ World common Use
- ◆ Good quality as well as conventional network
- ◆ Capable to various radio environment:
 - Indoor-to-outdoor
 - City-to-rural
 - Walker-to-train etc.
- ◆ Infrastructure for developing country
- ◆ Same telephone number in international/carriers/various radio environment
- ◆ Both voice and multimedia service
 - 2 Mbit/s transmission

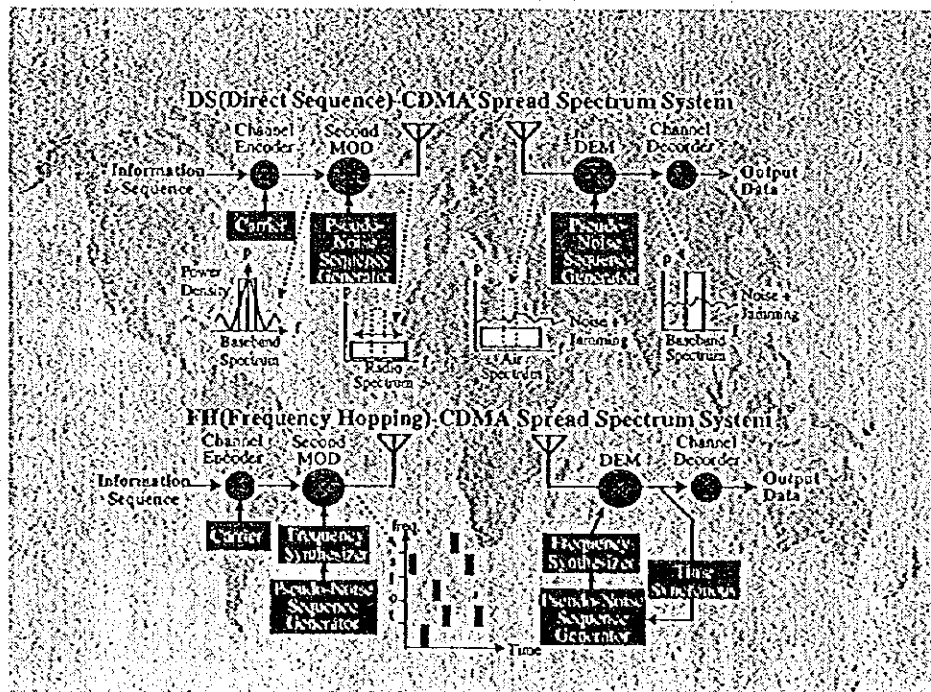


III. CDMA (Code Division Multiple Access)



III. CDMA

- ◆ High Frequency Reuse
- ◆ Strong to Interference
- ◆ Easy to keep a privacy
- ◆ High Quality
 - strong to fading
 - easy to handover
- ◆ Wide-range using
 - from low-speed voice to high-speed data (Multimedia)



CDMA

Code Division Multiple Access
will be the prevailing system of Mobile
system in future

SUMMARY

I. Optical Fiber Submarine Cable

Optical Amplifier/WDM/Soliton Technology

II. Global Mobile Communication System

IRIDIUM/GL STAR/ODDY/ICO etc

III. CDMA

FDM/TDMA/CDMA Direct Seq./Freq Hop

8. 収集資料一覧

入手先	資料名等
フィリピン：運輸通信省 (Department of Transportation and Communications)	National Telecommunications Development Plan 1991-2010 (July 1993 Update)
フィリピン：国家経済開発委員会 (National Economics and Development Agency)	Assessment Sheet (研修員選考基準) *本報告書に添付
フィリピン長距離電話株式会社 (Philippine Long Distance Telephone Company)	Facts About PLDT
マレーシア：総理府人事院 (Public Service Department)	研修員選考基準 (部分)
マレーシア：電気通信総局 (Jabatan Telekomunikasi Malaysia)	Annual Report
マレーシア：電気通信訓練大学 (Telekom Training College)	Telekom Training College Profile
マレーシア：電気通信大学 (Universiti Telekom)	The Next Step in Educaion - Prospectus
マレーシア：マルチメディア開発株式会社 (Multimedia Development Corporation Sdn Bhd)	Multimedia Super Corridor

JICA

