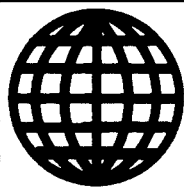


JPRS-TTP-90-006
28 JUNE 1990



**FOREIGN
BROADCAST
INFORMATION
SERVICE**

JPRS Report

Telecommunications

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

DTIC QUALITY INSPECTED 3

19981123 067

Telecommunications

JPRS-TTP-90-006

CONTENTS

28 June 1990

SUB-SAHARAN AFRICA

SOUTH AFRICA

- New Regional, International Projects Viewed
[Assuncao Almeida; Lisbon *DIARIO DE NOTICIAS ECONOMIA*, 16 Apr 90] 1

ZAIRE

- Satellite Telecommunications Links with Europe Cut [Kinshasa *AZAP*, 31 May 90] 1

ZIMBABWE

- British Company in Telephone Systems Project
[Arnold Raphael; Harare *THE HERALD*, 4 May 90] 2

CHINA

- Shandong To Import Communications Equipment from U.S.
[Jinan Shandong Provincial Service, 26 May 90] 3

EAST ASIA

CAMBODIA

- Vista Communications Station Construction Site Opened
[Phnom Penh Domestic Service, 5 Jun 90] 4
- Australian, French Telecommunications Aid Described
[Sue Downie; Bangkok *BANGKOK POST*, 21 May 90] 4

THAILAND

- Mobile Phone System from Finland [Helsinki *HUFVUDSTADSBLADET*, 22 Apr 90] 5

EAST EUROPE

BULGARIA

- Chairman of Communications Committee Interviewed
[Atanas Popov interview; Sofia *DUMA*, 12 May 90] 6

CZECHOSLOVAKIA

- Prague Telecommunications Incorporate Fiber-Optic Cable
[East Berlin *RADIO FERNSEHEN ELEKTRONIK*, Apr 90] 7

YUGOSLAVIA

- Astra, Intelsat To Carry Belgrade TV [Belgrade *EKONOMSKA POLITIKA*, 12 Mar 90] 7

NEAR EAST & SOUTH ASIA

BANGLADESH

T&T Board To Become Autonomous To Promote Efficiency
[Dhaka THE BANGLADESH OBSERVER, 1 May 90] 10

INDIA

Space Department Reveals Satellite Plans [Bombay THE TIMES OF INDIA, 30 Apr 90] 10
Teams Race for Deployment of Remote-Sensing Satellite [Madras THE HINDU, 23 Apr 90] 11
Official Briefs on Polar Satellite Launch Plans [Delhi INDIAN EXPRESS, 21 Apr 90] 11
Efforts Made To Extend Life of INSAT-1B Revealed [Madras THE HINDU, 23 Apr 90] 12
Insat-1C Reported Irretrievably Lost [Calcutta THE TELEGRAPH, 11 Apr 90] 13
Technology for New Radar Network for Air Force Studied
[Bombay THE TIMES OF INDIA, 25 Apr 90] 13
Seminar on Telecommunications Technology Reviewed [New Delhi PATRIOT, 24 Apr 90] 13
Plans To Improve Indian Telephone System Outlined
[N.N. Sachitanand; Madras THE HINDU, 26 Mar 90] 15
Broadcast Minister Opens Tamil Nadu Regional Service [Madras THE HINDU, 26 Mar 90] 18
Tentative Schedule for 1990-91 Television Projects
[Bombay THE TIMES OF INDIA, 16 Apr 90] 18

IRAN

President on Development of Telecommunications [Tehran Domestic Service, 17 May 90] 19

ISRAEL

'Amos Communications Satellite Project described
[Menashe Simhi; Tel Aviv QESHER, ELECTRONIQA, MAHSHAVIM, Jan 90] 20

WEST EUROPE

EUROPEAN AFFAIRS

FRG Minister on GDR TV Prospects [Hamburg DPA, 4 Jun 90] 23
FRG-CSSR Joint Venture for Production of Digital Telephone Equipment
[Paris LE MONDE, 6 Jun 90] 23

CANADA

Telesat Unveils Mobile HDTV Production Studio
[John Partridge; Toronto THE GLOBE AND MAIL, 25 Apr 90] 23
Telesat Nets Record Profit, Privatization Process Continues
[Peter Moreira; Ottawa THE OTTAWA CITIZEN, 2 May 90] 24
CNCP Telecommunications Changes Name to Unitel
[Toronto THE GLOBE AND MAIL, 10 May 90] 24
TTI Telephone Technologies Marketing Foneguard
[David Smith; Vancouver THE SUN, 8 May 90] 24
Bell-Northern Research Laboratory Opening, Expansion 25
 Optoelectronics Laboratory Opening
 [Dominique Lacasse; Ottawa THE OTTAWA CITIZEN, 17 May 90] 25
 \$120 Million Facilities Expansion
 [Jonathan Ferguson; Toronto THE TORONTO STAR, 17 May 90] 26
Northern Telecom Refines Teleconferencing System
[James Daw; Toronto THE TORONTO STAR, 29 May 90] 26
Unitel Applies to Offer Long-Distance Service at Discount
[Lawrence Surtees; Toronto THE GLOBE AND MAIL, 17 May 90] 27
Ten Companies To Test Pocket-Sized Wireless Telephones
[Lawrence Surtees; Toronto THE GLOBE AND MAIL, 24 May 90] 28
Phone Service Identifying Callers Allowed Despite Protest
[Lawrence Surtees; Toronto THE GLOBE AND MAIL, 10 May 90] 29

DENMARK

Greenland Radio to Constrict Home Rule Government Tie
[Copenhagen BERLINGSKE TIDENDE, 28 Apr 90] 30

FINLAND

Wireless Telepoint System Starts in Helsinki [Helsinki HELSINGIN SANOMAT, 11 Apr 90] 30
Tele-X Agreement Signed [Helsinki HELSINGIN SANOMAT, 5 May 90] 30
Pocket Radio Phone System for Helsinki [Helsinki HUFVUDSTADSBLADET, 20 Apr 90] 30

ITALY

Telecommunications System for Nuclear Physics Lab Described
[Turin MEDIA DUEMILA, Mar 90] 31
Italy, USSR Sign Telecommunications Accord
[Laura Sipala; Milan NOTIZIE ITALTEL, Feb 90] 32

SWEDEN

Ericsson Digital Switching Systems to USSR, CSFR
[Stockholm DAGENS NYHETER, 31 May 90] 32

UNITED KINGDOM

British Satellite Broadcasting Begins Operations
[London THE DAILY TELEGRAPH, 26 Mar 90] 33
Independent, BBC Television To Own Stake in Transmitters
[Jane Thynne; London THE DAILY TELEGRAPH, 9 May 90] 33

SOUTH AFRICA

New Regional, International Projects Viewed

90WT0078 Lisbon *DIARIO DE NOTICIAS ECONOMIA* in Portuguese 16 Apr 90 p 9

[Report by Johannesburg correspondent Assuncao Almeida]

[Text] For the first time in 42 years, representatives of Malawi, Botswana, Swaziland, and Lesotho visited South Africa's post office and telecommunications department to discuss subjects of mutual interest.

Ben Rootman, assistant manager for the South African telecommunications service, told *DIARIO DE NOTICIAS* that this initiative has far-reaching implications for regional cooperation in Southern Africa.

Asked for details on specific situations discussed recently at the meeting, the SAPT [South African Posts and Telecommunications] official said that "the participants held a very thorough and detailed discussion on the functioning of postal methodology, particularly funds transfers, parcel post, and remuneration for the services provided. Included on the agenda was the possibility of introducing priority mail pouches and rapid response business service involving the five countries."

No meetings have been held at this level since the African Postal Union Congress in 1948. The tone at the conclusion "was so positive that some participants expressed interest in holding another meeting," the department official told *DIARIO DE NOTICIAS*.

Rootman cited some significant statistics about the volume of the regional movement. For example, more than 276 tons of air mail was shipped from South Africa to its neighboring countries in 1988. Approximately 40.6 tons were received in return. Excluding packages, the volume of surface mail sent from South Africa to the surrounding states totaled 602 tons, while 134 tons were received from the neighboring countries.

"Visits were made to data processing centers and several other facilities to give the visitors an overview of the latest technological innovations. They also saw a sophisticated mail sorting system that serves the major cities of Cape Town, Durban, Johannesburg, and Pretoria."

SAPT has 1,763 fully-equipped stations and approximately 400 postal agencies spread out over all of South Africa. During the fiscal year March 1988 to March 1989, the volume of postal correspondence increased by seven percent, which means that 2.26 billion letters and packages were distributed during that period.

New 9,500 Km Cable

High-level SAPT officials told DN that the new SAT-2 submarine cable will be installed in 1994. That project is currently estimated to cost 500 million rands (about 30,000 contos). The cable will stretch from South Africa

to the Canary Islands and Madeira, where it will link up with other fiber optic submarine cables that make up the international network.

"The present SAT-1 submarine cable has been used by South Africa since 1969. Its efficient life is only 20 years, so it should already have been replaced. The fact that it is near the end of its economic life means that it now generates unacceptably high levels of noise and interference. That is why we are going to lay the new SAT-2 cable. It will be able to carry 7,000 voice channels, compared to 360 on SAT-1. That expansion will enable South Africa to meet its communications needs for the next 30 years."

The project is a major one in terms of size, since the total length of the cable is 9,500 km and will give its customers the kind of high quality service required by modern technology, already available to the public in most of the industrialized countries.

"Companies have switched to fiber optics cable because of the tremendous progress made in that technology and the advantages it offers in terms of quality, capacity, and security of that submarine cable system. This is the kind of system planned for worldwide installation," Ben Rootman added.

Every country should have an international telecommunications service, using contacts via satellite and/or flows along submarine cables, in order to make its services profitable. The services should be paid for by the beneficiary countries on the basis of time used, since these operations are costly and involve more than one state.

The South African Posts and Telecommunications service said that "there is interest in the new South Africa/Canary Islands/Madeira submarine cable on the part of other partners in Europe and elsewhere in the world.

"The new SAT-2 cable will be planned, financed, and maintained jointly by the user nations. At this point, South Africa is the sole user in the southern hemisphere; however, the majority of the more industrialized countries will associate with the project.

"Replacement is expected to take place in such a way that the new optic fiber cable will already be fully operating in fiscal year 1993/94, thus improving telecommunications services between South Africa and the rest of the world, particularly Portugal."

ZAIRE

Satellite Telecommunications Links with Europe Cut

AB0506090290 Kinshasa *AZAP* in French 1330 GMT 31 May 90

[Excerpt] Kinshasa, 30 May (AZAP)—Lengelo Muyangandu, the state commissioner for post, telephone, and

telecommunications (PTT), today was told by maintenance technicians of the Zairian National Office of Posts and Telecommunications, ONPTZ, that satellite telecommunications links between Zaire and Europe have been cut off since 23 May 1990. This was due to obsolete equipment at the N'sele international earth station, which was inaugurated on 30 June 1971. The PTT state commissioner was visiting the facilities of the earth station, which has 130 telephone circuits and is managed by ONPTZ. He said he was concerned by the difficult situation being experienced by the country in the field of telecommunications.

"The (?depolarization) of the [word indistinct] on the aerial feed of the N'sele international earth station had been jamming the frequencies of other earth stations in Europe. Thus, Zaire has been told by the International Telecommunications Satellite Consortium to cut its links," Manyambu Nwanda, the station chief engineer said. It was learned that one of the immediate [word indistinct] contemplated was to apply another layer of paint on the aerial feed or bring in Rantec, the U.S. company which built the [word indistinct] earth station to provide polarization to the aerial feed. As soon as the line of credit from the African Development Bank (\$73 million) is opened, construction of a new international station will begin. This was confirmed by ONPTZ chief Executive Gbaligaza Yangamo. [passage omitted]

ZIMBABWE

British Company in Telephone Systems Project

55000063 Harare *THE HERALD* in English 4 May 90
p 8

[Article by Arnold Raphael]

[Text] Zimbabwe could well become Southern Africa's leading supplier of telecommunications equipment following an agreement between WRS Electronics, of Harare, and the British company Telecom Technology International.

TTI said here yesterday that it will provide the expertise and central processing units to establish a manufacturing base in Harare for its new and highly successful Interconnect 2,000 range of telephone systems.

The UK group approached WRS because it was rated by the International Telecommunications Union as the only company in Zimbabwe with the capacity to serve as the nucleus of a telecommunications industry.

A TTI spokesman said that WRS itself considered its manufacturing base and quality of its staff as being among the company's principal assets.

The spokesman also stressed that TTI's would not be supplying kits for re-assembly. The Harare project entailed a full manufacturing process, with key elements supplied by TTI's Oxford plant. These high-tech components are among the most advanced in the world.

The Zimbabwe operation will have complete control of the manufacture of the systems architecture through a transfer of technology. TTI will continue to control the related software.

TTI expect to earn 1 million in the first year of the Harare venture, gradually rising to about 2 million. The British company is not investing as such in WRS, but acting as supplier and technical adviser.

The managing director of WRS, Mr Alf Rodly, said here that "collaborating with TTI will give us access to the manufacturing technology of one of the latest European subscriber telephone systems. The interconnect 2,000 range meets a number of criteria for African markets, not least of which is ruggedness and reliability coupled with sophisticated features and facilities".

Mr Rodly added that it was hoped to start production this year and to extend WRS sales "beyond Zimbabwe into neighboring African states where we already have a strong position".

Shandong To Import Communications Equipment from U.S.

*SK0106010590 Jinan Shandong Provincial Service
in Mandarin 2200 GMT 26 May 90*

[Text] On the afternoon of 26 May at the Qilu Guesthouse of Jinan City, the provincial Postal and Telecommunications Administrative Bureau and the Motorola Corporation of the United States held a ceremony to sign an agreement on importing equipment for building a mobile communications network in Shandong peninsula.

The mobile communications network is the most advanced communications means in the world. The mobile communications network of Shandong peninsula serves Jinan, Zibo, and Weifang Cities. The imported equipment will be installed by the end of this year and the network will formally be available to users in the first quarter of next year. The network can satisfy the demands of 7,500 communications subscribers in these three cities.

The mobile communications network will open international and domestic facsimile communications services.

Zhang Ruifeng, vice governor of the province, attended the ceremony.

CAMBODIA

Vista Communications Station Construction Site Opened

BK0506070090 Phnom Penh Domestic Service in Cambodian 0430 GMT 5 Jun 90

[Text] A ceremony was held at the Bayon ground satellite station on the morning of 2 June by Cambodia's Posts and Telecommunications Department to open the construction site for a small "Vista" communications station in the presence of Comrade Kim Seap, deputy minister of communications, transport, and posts.

On that occasion, Comrade Net Chreng, chief of Cambodia's Posts and Telecommunications Department, disclosed that the construction of this "Vista" station was to begin on 2 June according to the cooperation agreement signed in February 1990 between Cambodia and Australia.

Comrade Net Chreng also disclosed that the cost of this "Vista" station was around 2.8 million U.S. dollars, and that eight to 24 of its channels can be used for telephone links with various countries in the world.

Australian, French Telecommunications Aid Described

55004305 Bangkok BANGKOK POST in English 21 May 90 p 21

[Article by Sue Downie in Phnom Penh]

[Text] Work on Cambodia's first joint venture with a Western company began last week at the satellite site.

Since the Government announced its new foreign investment code last year, few investors from non-socialist countries have invested in this communist-run country.

Some have been put off by the continuing civil war which is draining 30 percent of the country's budget and causing an air of instability; others are wary of the trade embargo, imposed by the United States in 1979 when Vietnam drove out the Khmer Rouge and set up a new government in Phnom Penh.

Eleven years later, the government, now largely independent of the Vietnamese, is courting international investors to help rebuild the country, especially the shattered infrastructure, through joint ventures or straight investment projects.

After a series of discussions, the government now has substantial contract with Overseas Telecommunications Commission (OTC) International Ltd of Australia.

Under the 10-year, \$10-million contract, OTC will provide an international telecommunications system, train staff and help prepare for a domestic system. The contract was signed in March, almost 12 months after OTC began discussions with the Cambodian authorities.

During that time, America's AT&T came and looked, as did British Telecom, and a Thai company submitted a proposal, but the real competition was between OTC and French Radio & Cable.

After a heated debate in the National Assembly (Parliament), the Australians finally came out ahead of the French, as they had done the previous year in neighbouring Vietnam.

"It is a shared investment, with OTC putting in 60 percent and the Cambodians 40 percent," said OTC representative in Phnom Penh, Stig Engstrom. "It is only shared on incoming calls, not outgoing, so OTC will be in the red for the first four years, and Cambodia will make a profit from day one."

By mid-August, Cambodians will be able to make calls anywhere in the world without going through Moscow, Hanoi and Ho Chi Minh City. They will also be able to receive television from other countries, including the West.

Of the existing 24 international lines in the country, 18 are used by the Soviets. Only six are available to Cambodians, and two of those are used for television broadcasts from the Soviet Union.

Of the country's four international telephone lines, operated by the Directorate of Posts and Telecommunications (DPT), two are directed through Moscow and one each through Hanoi and Ho Chi Minh City.

Under the OTC deal, this will be boosted to eight in August and 30 in January next year. The contract provides for 5-10,000 lines by 1993.

The DPT is building the new satellite station beside the Soviet-built satellite, on the site of Phnom Penh's famous old cathedral which was dismantled during the Khmer Rouge rule from 1975-79.

"It will be an interim satellite dish, which will be upgraded in January next year," said Mr Engstrom. "We will then put in an international exchange with 300 new lines. A hundred of them will be for the government and the rest for private use.

"Most will go to hotels, international agencies and businesses. All the hotels will have IDD (international direct dial), fax and telex. It will be the first time businessmen can link themselves up directly with the outside world.

"They will have 300 lines for two years, then we will put in a standard-A antenna and a new exchange with a capacity for 5-10,000 lines. Then they can take out the old exchange which was installed in 1958."

From January, the Cambodians could have four international television lines and technically would be able to receive programmes from anywhere in the world, although the U.S. embargo will prohibit the screening of shows from America.

"They are very pleased they can have four TV stations from other countries. In theory, they could have two hours of television from Australia, France, Britain and Bangkok each day," said Mr Engstrom.

OTC won the contract to provide Vietnam's international telecommunications system and has already installed earth stations in Hanoi and Ho Chi Minh City.

Several companies are now vying for the contract to supply Vietnam's domestic system, including Telecom International Australia, West Germany's Siemens, British Telecom and France's Alcatel.

"Cambodia will have a better international system than Hanoi or Ho Chi Minh," said Mr Engstrom. "The big thing here is that they will have IDD. There will be facilities for data services, electronic mail and direct hook-ups for computers, from 1992. This is more than Vietnam has.

"And here, they are not as interested in listening to phone calls or monitoring faxes, which is very time-consuming and requires special equipment."

The Cambodian Government has started discussions with Western companies for a domestic network. A delegation from Siemens arrives this week, offering loans which will be attractive to this war-torn country. And

DPT director Neth Chroueng is currently in France discussing with Alcatel the possibility of supplying a domestic system.

"Under the OTC contract, we will work with the Cambodians to prepare for a national network plan," said Mr Engstrom. "OTC has never done a domestic system, but this could be the first, or we will assist the Cambodians in evaluating different tenders. It could happen that we draw up plans implemented by the French."

THAILAND

Mobile Phone System from Finland

Helsinki HUFVUDSTADSBLADET in Swedish
22 Apr 90 p 10

[Text] Telenokia is going to deliver an NMT 900 mobile telephone system to Thailand. The net at first will cover Bangkok and its most important suburbs. Functioning as the network operator will be the Advanced Info Service Company. The telecommunications agency in Thailand has granted the company a 20-year concession for this activity. The company is the first to offer private mobile phone service in Asia. Telenokia's first delivery is valued at 30 million Finnmarkkas. The net will later be expanded to cover the entire country.

BULGARIA

**Chairman of Communications Committee
Interviewed***90WT0086A Sofia DUMA in Bulgarian 12 May 90 p 2*

[Interview with Atanas Popov by Rositsa Stancheva and Atanas N. Atanasov; place and date not given: "International Telephone Communications Will Be Converted Into Digits"]

[Text] By decision of the Organization for Telecommunications of the European Economic Community, by the end of 1992 the main channels and junctions on the continent must convert to the digital principle, Atanas Popov, chairman of the Committee for Communications and Information, told DUMA.

This is a modern way for the conversion of signals, which ensures high quality and security.

We have been warned that after 1992 international telephone communications will be based exclusively on digital equipment. We have no choice: We shall either change the main cables or be excluded from global telecommunication and information systems. The possibility exists of attracting foreign capital and procuring the necessary digital equipment. There will also be an increase in the transit communications flow and foreign currency income it generates. This will also improve the quality of telephone communications in our country.

DUMA: Does this mean we are on the threshold of quality changes?

Popov: More than that. There is a "project of the century" concerning the transcontinental main line, which begins in Australia, goes through Japan and the USSR, reaches Varna in our country, and ends in Italy. This is a project undertaken by a large global consortium. It is based on optic cables (fiber optics instead of copper cables). It will make possible a huge transit flow across Bulgaria and will raise high the standard of our communications system.

DUMA: Is this a matter of the distant future?

Popov: Work has already started in Australia and Japan. Even according to the most pessimistic projections, this "project of the century" should be completed by the end of 1994.

DUMA: What about television?

Popov: In comparison with the telephone system, television and radio equipment match contemporary standards. The entire second channel is based on Japanese technology.

By 1992 television signals will reach all settlements with a population in excess of 100 persons. At present the first channel covers 92 percent of the territory, and the second, 82 percent; the third, which today transmits

Soviet television, covers 30 percent (it is being developed as the third national television network). A powerful center is being built in Kaliakra for radio broadcasting, and one near Svilengrad for television and radio programs.

DUMA: Are satellite television antennas forbidden?

Popov: Any citizen of our country has the right to freely receive satellite-transmitted programs. All that is needed is a special antenna for which no permission is required—only registration, as is the case for owning a television or radio set. On the basis of an agreement with SAT-1 and EUROSAT, we have the right to receive any television program transmitted through their satellites. We are experimenting in five tourist complexes, in Kazanluk and part of the Mladost residential district in Sofia in receiving programs broadcast in space and transmitted through cables.

DUMA: Is the building of cable networks in our country allowed?

Popov: With a developed cable system in a house building, a complex, or a hotel, the broadcasting of satellite programs without the written agreement of its makers is forbidden. Violations of this requirement may lead to penalties to the specific violators (companies or cable network owners). This also affects the prestige of the country at a time of intensifying struggle against so-called intellectual piracy, which is waged in all civilized countries.

DUMA: What is the reaction to this of the Committee for Communications and Information?

Popov: Together with the Authorship Rights Agency, we are engaged in a dialogue with some 20 satellite television organizations. All of them demand that national technical standards be observed and, for the quality of the transmission of their programs, not be different from that of national programs. We are about to sign an agreement with a French television company for the free use of its channel 5, which is received in Belgium and Canada.

DUMA: Does the communications system have its own way of solving the currency problem?

Popov: A certain farsightedness and some luck are making it possible for us to obtain loans from England, Italy, France, and West Germany. This is backed by our contacts with leading telecommunications equipment companies such as Plessis, ITALTEL, ALCATEL, and Siemens. We are also conducting talks with the Swedish company Erikson.

DUMA: On the matter of money, should you not have your own bank? In many developed countries, Postbank is the largest bank.

Popov: We are considering this matter, as well. In cooperation with our own bank, we are organizing a postal bank with the right to engage in crediting operations.

DUMA: What stage of development has been reached in having an electronic newspaper, electronic mail, and telematic services?

Popov: The BULPAK data-transmission network is already working on a 24-hour-a-day basis, with 200 subscribers. They have access to global information centers and can exchange data with tremendous speed. The purpose of the INFOTEL service is to provide a new environment for the distribution of computer information through television facilities. The time is not far when, together with teletext (information transmitted in the opposite direction by the television ray), this will become a new mass media for public use. That is why we are a committee not only for communications but for information as well.

CZECHOSLOVAKIA

Prague Telecommunications Incorporate Fiber-Optic Cable

90P60008 East Berlin *RADIO FERNSEHEN ELEKTRONIK* in German No 4, Apr 90 p 204

[Summary] The first stretch of fiber-optic cable has gone into operation at the Central Communications Building in Prague-Zhizhkov. The fiber-optic cables, made of glass fiber, link the automatic telephone exchanges of Prague-Liben', downtown Prague and Prague-Dejvice. This 10.6 km stretch of digital telecommunications cabling is the first operational stretch of fiber-optic cabling to be used in the CSSR and will markedly improve telecommunications operations in Prague.

YUGOSLAVIA

Astra, Intelsat To Carry Belgrade TV

90BA0034A Belgrade *EKONOMSKA POLITIKA* in Serbo-Croatian 12 Mar 90 pp 25-26

[Text] If everything goes as planned, beginning this fall, in September or October, Yugoslavia, represented by Radio Television Belgrade, will be the first country and TV institution outside the European Community which will cover with its TV picture the space of the world's largest market (beginning in 1992), with over 320 million inhabitants. That is when a new satellite will be launched in the series of Astra telecommunications satellites, one of whose 16 channels was reserved a year ago by the Belgrade television station. Inhabitants of the "united Europe" will thus be able by simply pressing a button on their remote control to include in their choices the regular First Program of Belgrade television, which means that instead of foreign (to us, but their own domestic) TV series, Yugoslav programs of the same kind will be broadcast.

What is more, the inhabitants of the second largest market in the world (after 1992, until then the largest) will probably not be denied the satisfaction of being able

to watch Belgrade television either (for all practical purposes, except for news broadcasts, this is the programming of Yugoslav Radio-Television), since RTV Belgrade also intends to purchase a channel on the American Intelsat satellite. The Government of Serbia recently blessed the efforts of its own TV station to "open the path through the sky to the European and world public." The only question that remains open is whether the spoilt-by-choice, changeable, and finicky king-consumer of the largest world markets (or public) will feel the need to press that button of the Belgrade-Yugoslav channel.

The Price of Satisfaction

The people at Belgrade television consider the cost of the satisfaction of having one's broadcasting spread all over the world a trade secret. As a matter of fact, that trade secret is worth no more than the price of a telephone call to the Astra headquarters in Luxembourg (the telephone number is 99 352 717 251), but it is not certain that it is possible to use Serbo-Croatian or any other of the languages which Yugoslav nationalities and ethnic minorities use as their mother tongue. But even that telephone expenditure is not indispensable. Leafing through the Belgrade daily press from a few months back, when in spite of the reservation of the channel the issue was still mainly "in the works," one finds the datum that in the first year the price of its satellite channel will be about \$12 million (about \$33,000 or about 400,000 dinars per day). The cost of the transponder alone, this is the space segment, is about \$8 million, and then a ground station has to be provided (perhaps the existence of Ivanjica means somewhat lower costs), and then production....

It is a fact based on professional estimates that today one out of every 10 Europeans watches cable television. By reducing the cost of antenna connection to what at the moment amounts to about 200 pounds per user, satellite television is really becoming a thorn in the heel of government and local TV stations. Marketing experts envisage that satellite television will therefore become the central medium for all pan-European advertising campaigns.

At the present time, about 150 television stations are broadcasting all over the world by satellite, and, according to numerous surveys, it turns out that the users of this mass medium, which in the middle and end of the current decade experienced a true explosion, are feeling a certain saturation. So all that is still growing is the demand for specialized programming, and this is putting new and ever more difficult demands on the owners of the present and future channels. It is expected that even by 1998 more than 600,000 hours of programming will be broadcast by satellite. The Eurosport channel, for example, is more and more frequently requesting tapes of sporting events from Yugoslav Radio-Television as well as specialized programs for children such as D Children's; the demands of users for

cartoons without violence are being met by the purchase of such films from Poland and Bulgaria.

Marshall McLuhan, the great media philosopher of the sixties, said that the electronic media would create a "global village," but when the first telecommunications satellite Telstar appeared, launched just before he died, he said: "At the moment, we are in utter darkness as to the implications of Telstar and other satellites. However, sooner or later this will have an impact on the way every child learns and acquires knowledge." Exactly that has happened. The satellites have confronted the broad masses with foreign cultures. At the same time, the development of the mass media has speeded up and guided the development of other media: fuller coverage by the regional press, regional and local radio, and the development of direct mail, all of which was also stimulated by the development of computers. But regardless of how close the satellites bring other cultures to people, language barriers are for the present proving difficult to overcome. The Super and Sky channels, which are watched a great deal in the English-language area (Super has 19,000 paid subscribers), are watched very little in Germany and France, and they are trying to solve the problem by translation (subtitles are given preference, since they are cheaper and leave the original language).

A survey done by TV Belgrade, and those who made the decision to purchase the satellite channel might well have had it in hand, says among other things that the present satellite broadcasting can be divided into four groups: monolingual programming financed by the television companies of several states (four francophone countries: France, Belgium, Switzerland, and Canada have since 1984 been broadcasting 7.5 hours of programming per day to what amounts at the moment to 6.2 million households, while three countries in the German-speaking area: Germany, Austria, and Switzerland, broadcast eight hours of programming per day to about 3 million households), national programs such as RAI Uno, BBC1, BBC2, and several German regional programs, European cultural and educational programs (such as the French SEPT K7, which [text missing as published] into a school of foreign languages), and, the most numerous, the commercial programming. The terrific mutual competition is driving even the so-called national programs, which certainly are not without strong commercial ambitions, to seek in every way an access to new markets. During the recent "Yugoslav Video Show" event in Belgrade, the BBC, unable for technical reasons (customs interference on communications lines) to unscramble its program for Yugoslavia for this special occasion, allowed open viewing, that is, free viewing of BBC programs throughout Europe for all of 7 days. The business logic here is straightforward; getting users in the habit so that at some point they will "loosen the purse strings."

Explanation in Business Terms

TV Belgrade, as a public enterprise, intends to operate these satellite projects as a joint stock company and

considers them its own "important business and programming move" (they like to make the comparison with CNN). They consider this good business and believe it will help to get better information to our people in Europe and America about events in the homeland. They are assuming, and this has probably been verified, that there are both companies and private persons who would find it practical to advertise over this medium, and mention is made that foreign partners might also be interested. However, this move on the part of TV Belgrade has aroused quite a bit of surprise and resentment on the part of others in Yugoslav Radio-Television, who say that for four years now they have been working to draft a joint platform for Yugoslav Radio-Television to reach the world through space and that now the question arises of their coexistence in creating the "global village." The federal government is behaving similarly; it has also shown signs of interest in broadcasting the promotion of reforms in Yugoslavia by satellite. And it seems that there was money everywhere, but there will not be any channels free in the foreseeable future. The cool response from Belgrade television is that there are no problems at all, that is, that the others, including the federal government, will also be able to broadcast what they like for a fee over the Belgrade satellite channel, first of all by taking part in the joint stock company, but that is not the only way.

What actually would be the point of this project, given all the terrible communication we have mentioned and the indisputable language barrier? World economics experts feel that in the less-developed countries it is particularly important to affirm the development ethic, and this has been confirmed in the countries which have managed to free themselves of the "embrace" of underdevelopment (Singapore, South Korea). This is the ethic of self-confidence and belief in one's abilities, rather than shutting oneself off within one's borders. But the assumption that the world has the wrong idea about Kosovo, about Serbia, or about any other part of Yugoslavia or about Yugoslavia as a whole, no matter, does not seem to be the best possible motivation for this opening up. Direct or indirect acknowledgments to the effect that the purpose of using the satellite channel is precisely to "spread the truth" about oneself are not rare.

How in general is a favorable image of a country built anyway? Perhaps through economic and political freedoms of its citizens, through economic and political stability, a civilian society, human rights and freedoms, good conditions and legal guarantees for foreign trading partners, the quality of products and services.... Truth of that kind is probably easy to spread even through the media which already enjoy confidence in the world and have influence in it. If the Yugoslav guest workers are the target group, then it would be worthwhile to take into account the fact that the so-called first generation is coming to the end of its working life and energy, while the second and third by and large already have the language barrier and are integrated into the world in which they live, and they are already in the habit and

under the influence of the media there. It also seems relevant to ask whether private owners, the private sector of the economy, would (and will) finance such a channel, that is, would TV subscribers or taxpayers actually be the financiers if they were asked? Does it not seem a bit like a Rolls-Royce without an engine?

One thing about it is certainly good. For a time, it will be quite possible to sell the space segment to someone

at a price not much less than what was paid. At the beginning of the eighties, when one of the similar satellites was launched, INA of Zagreb announced its intention to purchase a channel that would broadcast the program "Tito 1." In response to the immediate objections and the question: What good would it be? INA made precisely that answer—at least it would be able to sell it. And very soon that was the end of the story.

BANGLADESH

T&T Board To Become Autonomous To Promote Efficiency

55500076A Dhaka *THE BANGLADESH OBSERVER* in English 1 May 90 pp 1, 14

[Text] The Telegraph and Telephone Board (T&T) will be converted into a fully autonomous body with effect from July 1 next as a further step to achieve operational efficiency of the country's telecommunication sector.

There will be two Boards to look after the functioning of the sector. One will be known as Policy Board headed by the Minister with representatives from the relevant ministries as members while the other as Executive Board headed by a Chairman, according to highly placed official sources.

The proposed Executive Board will look after day-to-day affairs and execute the policy and guidelines given by the Policy Board.

Meanwhile, between July, 1990 and July, 1995 the proposed T&T Corporation is expected to install one million telephone connections in the country. Besides, by July, 1995 the telecommunication network will be transformed into full fledged digital system from the existing analogue system.

The prevailing installation charge of a telephone is likely to be reduced to Taka 10,000 from Tk. 30,000. Reduction in the present rates call and shifting charges is also under active consideration of the Government. The proposed Corporation is expected to invest Taka 5,000 crore between July, 1990 and July, 1995. The Government will, however, have no financial involvement.

After launching of the proposed Corporation, loans from local and foreign sources will be available. In case of foreign loan, the corporation will require prior approval of the Planning Commission and External Resources Division of the Government.

During 1989-1990 the T&T Board earned a total profit of about Taka 400 crore with total telephone connections of 2.4 lakh. This profit is expected to go up to Tk. 2,500 crore annually by 1995 when the number of telephone connections will be 12.5 lakh, the sources indicated. It is further envisaged that by 1995 the proposed Corporation will be able to refund its entire loan.

With the proposal of converting T&T Board into a Corporation the Government is also actively considering setting up of three satellite stations—two at Mohakhali and other at Talibabad. The setting up of one such satellite station is in progress. By 1995 video telephone (ISDN) is likely to be in operation in the country, official sources said.

INDIA

Space Department Reveals Satellite Plans

55500080 Bombay *THE TIMES OF INDIA* in English 30 Apr 90 p 7

[Text] New Delhi, 29 Apr (UNI)—The department of space have formulated massive programmes for implementation during the eighth plan period.

Operationalisation of Indian remote sensing spacecraft (IRS-1B and IRS-1C), INSAT-II test spacecraft, augmented satellite launch vehicle (ASLV) is scheduled to be completed during this period.

Development of geo-synchronous launch vehicle (GSLV) and cryogenics engine and stage is another major activity proposed to be carried out.

With a projected outlay of Rs 3,842 crores, the department proposes two operational space systems, namely INSAT and IRS, which will need to be maintained and expanded to meet the projected demand of services, along with necessary in-orbit replacements and operational ground support systems.

In the case of the IRS system, the acquisition, processing and dissemination of the satellite data to the user community will also be a major responsibility of the department of space.

The PSLV, a launch vehicle, is estimated to cost Rs 414.96 crores. The objective of this vehicle is to place an IRS class satellite in polar sun-synchronous orbit. An indigenous engineering model of the IRS satellite (IRS-1E) will be flown in the first developmental flight of PSLV which is scheduled for launch in 1991-92.

The satellite will primarily provide a host of technical data which will be of use to evaluate the performance of PSLV-D1. In addition, the satellite is also expected to send remote sensing data for survey and assessment of earth's resources.

The first indigenously built IRS satellite (IRS-1A), launched in 1988, is now operational and providing data that is being used in forestry, hydrology, geology and agriculture.

The first generation operational INSAT-1 series satellites, conceptually designed by India, were procured from abroad. The second generation indigenous INSAT-II spacecraft series are already under fabrication in India.

The INSAT-II series, which is more complex and sophisticated than INSAT-1, consists of two test satellites, of which one is expected to be used for operational purposes, followed by three operational satellites.

The INSAT system provides for domestic long-distance telecommunications, meteorological earth observation and data relay, nationwide direct satellite TV telecasting to augmented community TV receivers in rural areas,

nationwide radio and TV programme distribution for rebroadcasting through terrestrial transmitters, TV and radio programme and news feed assembly from various locations and disaster warning.

The major new schemes and projects proposed for implementation during the decade, 1990-2000, focus on the operationalisation of space services on continuing basis to enable the country to derive full benefits of space technology in the areas of communication including TV and radio broadcasting and networking, natural resources survey and management, meteorology and introduction of specialised services like search and rescue operations and mobile communications and national level resource information system.

Teams Race for Deployment of Remote-Sensing Satellite

55500071 Madras *THE HINDU in English*
23 Apr 90 p 7

[Text] Madras, April 22. All systems are getting ready at Sriharikota for the launching of the giant Polar Satellite Launch Vehicle (PSLV) which will deploy a 1,000-kg Indian Remote-sensing Satellite called IRS-1E, according to sources in the Indian Space Research Organization.

There is already a "neck-and-neck" race between the project teams of the Augmented Satellite Launch Vehicle (ASLV) and the PSLV about which flight will take to the sky first. It looks as if both will be launched in early 1991.

Right now, Sriharikota is getting ready for the firing of the motor of the third stage of the PSLV. The third stage motor called the PS-3 has to work with a flexible nozzle for better efficiency and the whole nozzle will keep moving as it is being tested. "The PS-3 with flexible nozzle will be tested. It will be a new development. Then, we have to do the high-altitude test on PS-3. All these will have to be completed. Otherwise, we have no major problem," says an ISRO source.

Third largest in the world: The first stage motor of the PSLV will also be fired for the second time at Sriharikota. ISRO had successfully tested it for the first time on October 21, 1989. The motor, the largest to be developed by ISRO, is 2.8 meters in diameter and 20.4 meters long. It contains 128 tonnes of solid propellant. This is the third largest solid booster developed in the world, next only to the U.S.'s shuttle's strap on boosters and Delta's booster. The successful firing of these first and third stage motors will be major "milestones" towards developing the PSLV, whose lift-off weight is 275 tonnes and height is 44.18 meters.

All the ground facilities for the launching of the PSLV are ready at Sriharikota (SHAR). The gargantuan Mobile Service Tower (MST) for vertically assembling the four stages of the PSLV and mating the satellite with it has been erected. The MST is 75 meters high and weighs

3,000 tonnes. It can be moved out on its giant wheels on tracks. "We have moved it around; the final trimmings are being done and final connections are being given. A new control center has been set for the PSLV and its satellite. It is called the Mission Control Center and the launch Control Center. Both are in the same place, but far away from the launch-pad. The radars are ready. Check-out is ready. Telemetry is ready. All systems are getting geared up. The integration is getting ready," say ISRO sources.

But which carrier will go up first—the ASLV or the PSLV? "We are trying to see which one will go up first and it will be known in a few months," say the sources.

The satellite (IRS-1E), built by the ISRO Satellite Center at Bangalore, is almost ready. The ISRO Satellite Center had built a few engineering models of the IRS-1A, which was launched by the Vostok vehicle from the Baikonur cosmodrome in the USSR on March 17, 1988. One of these engineering models, which are flight-worthy, is being converted into IRS-1E after a thorough check-up.

Utmost care: ISRO is taking the utmost care with the launching of the third flight of the ASLV as the previous two had been failures. The second flight on July 13, 1988, was a failure because the control was inadequate and error built up. As the error built up, the rocket's attitude was more than what was allowed and so the structural loads increased. The result was that the rocket broke up and splashed into the sea because the vehicle was not designed for such structural loads.

The ASLV's control systems are now being totally redesigned to take care of external disturbances such as a gust of wind.

Mr R. Aravamudan (53) has taken over as the Director of SHAR after the retirement of Mr M. R. Kurup.

Official Briefs on Polar Satellite Launch Plans

BK0605102590 Delhi *INDIAN EXPRESS in English*
21 Apr 90 p 5

[Text] Thiruvananthapuram, April 20—The Polar Satellite Launch Vehicle (PSLV) is expected to be ready for launch by the end of the year. An integrated trial of the second stage of the PSLV, which will be using the liquid propulsion system fabricated by the ISRO [Indian Space Research Organization], was successfully tested last month at the Liquid Propulsion Systems Centre, Mahendragiri, 100 km from here.

The configuration for the second stage will be ready by August, while an identical configuration of the fourth stage of the PSLV, which also will be fired by liquid propellants, will be ready by June-July for the final qualification of the launch.

Dr. Muthunayagam, director of the Centre, told a visiting press party that a major review of the second stage of the PSLV was expected to be done in May which would decide the final date of the launch.

Work in liquid propulsion over the last few years has established the capability of the ISRO to design, develop and test the liquid propulsion systems. The PSLV uses liquid engines for the second and fourth stages, the assembly and testing of which has been done at the Mahendragiri Centre of the ISRO.

Dr. Muthunayagam said the final approval for the geosynchronous satellite launch vehicle [GSLV] was expected in a few months time. A cryogenic engine of about 12 tonnes thrust is being considered for application in the upper stage of the GSLV. The lower stages will use engines without cryogenic configurations.

The final qualification for A-22 neutron engine thrust using biopropellants for INSAT-IIB [Indian National Satellite] has been test-fired in the Centre's simulated high altitude test bay.

The Centre is also in the process of developing a biopropellant liquid apogee motor of 440 neutron thrust for the INSAT-II satellite propulsion. For Indian Remote Sensing [IRS] Satellite-IB, the design for A-11 neutron thruster has been completed and the development of this will soon be under way.

It is to be noted that all developments in the field of liquid propulsion systems have been achieved through indigenous efforts. The only foreign component in the PSLV, for example, is the engine for the second stage. The foreign component has come in the form of a technology transfer from SEP [expansion unknown], France, under a contract entered into by the Government and the French quasi-government company. The rest of the systems are entirely developed by our scientists, Dr. Muthunayagam said.

Around Rs [rupees] 100 crore will be spent on the second and the fourth stage of the PSLV. The funding for the Centre depends on the programmes undertaken by it. The budgeting for the Centre is divided into two: one to establish facilities which were of a permanent nature and which could be used in other programmes, and to meet the actual expenditure for the materials for fabricating the vehicle system. The second stage of the PSLV, which is a very complicated configuration, alone required Rs 65 crore, Dr Muthunayagam said.

In 1989, the Centre got Rs 16 crore for its activities and Rs 6.5 crore for its cryogenic project. The INSAT, IRS and SLV assignments fetched it a sum of Rs 20 crore. Regarding the current year, the Centre is expecting an allocation of Rs 20 crore. It is also expecting a quantum leap in the allocation for cryogenic projects to the tune of Rs 20 crore pending the approval of the project by the Centre.

Efforts Made To Extend Life of INSAT-1B Revealed

55500070 Madras *THE HINDU in English*
23 Apr 90 p 7

[Text] Bagalore, April 22. In an attempt to maximize the life of the ageing INSAT-1B satellite, the Indian Space Research Organization (ISRO) here is allowing a certain north-south drift of the satellite, partially affecting some of the present television, telecommunication and data-relay users.

ISRO sources here said the manoeuvre was necessary to conserve whatever fuel was left in the satellite to extend its life at least till the June 12 launch of the repaired INSAT-1D. Normally, a small amount of the satellite fuel is consumed in orbit correction and position maintenance maneuvers but considering the present state of INSAT-1B, a wider margin of drift was being accommodated than what was normally allowed, the sources said.

The INSAT-1B is the only spacecraft in the four satellite "INSAT One" series built by the Ford Aerospace Corporation of the U.S., which functions satisfactorily even beyond its expected life span of September-1989.

The sources said that as the satellite had exceeded its six-year life time by six months, its performance could not be totally relied upon. If the north-south drift exceeds easily adjustable limits, then a large amount of fuel would be needed to bring it back on its axis stabilization mode. If there is insufficient fuel for this manoeuvre, then the satellite would drift away into cold space.

Another factor causing concern to ISRO officials is that INSAT-1B is the only satellite having a very high resolution radiometer which took meteorological imageries. If anything happens to INSAT-1B between now and the INSAT-1D launch, then this crucial service will be affected.

The hired satellite facility like the ARABSAT satellite, the Soviet Intersputnik Stationar-13 satellite and INTELSAT do not have any weather monitoring component and it is imperative that the INSAT-1D is successfully launched to main meteorological services, according to the sources.

The ARABSAT's 12 fss C-band transponders are being used for telecommunication services. After the INSAT-1C power bus short-circuit, all its telecommunication services were transferred into the ARABSAT. The INTELSAT transponder was taken to make up the loss of one telecommunication transponder on board the INSAT-1B.—PTI

Insat-IC Reported Irretrievably Lost

55500073 *Calcutta THE TELEGRAPH in English*
11 Apr 90 p 1

[Text] New Delhi, April 10 (PTI): The space department has said that Insat-IC which lost earthlock in November is irretrievably lost.

A short circuit in the power-bus of Insat-IC weeks after its July 1988 launch had destroyed all redundancies in power systems and in November 1989 a drained battery made it lose earthlock.

By the time telemetry contact was reacquired, various satellite subsystems were at extreme low temperatures and had failed. "Now it is not possible to retrieve the satellite," the space department said.

Technology for New Radar Network for Air Force Studied

55500068 *Bombay THE TIMES OF INDIA in English*
25 Apr 90 p 3

[Text] Bombay, April 24 (PTI). Indian scientists are developing the technology for building a network of radar systems with improved detections which can update information on flying objects to increase the capability of the air force.

The multi-sensor multi-radar networking system using various data communication links through satellites, fibers and other types of microwave networks, would find application through a central computer.

The network would be operational within the next five years, Dr Y.S.N. Murthy, director, weapons system, Defence Research and Development Laboratory, Hyderabad, told a symposium on advances in digital signal processing and its impact on electronic instrumentation.

He said "Such radar systems would be able to talk to each other and data on various types of airborne targets and other information can be transferred from one radar to another, and thus improve the reliability of detection and extend the range and performance".

Unlike current radar systems that use Magnetron (very high frequency oscillator based on magnetic field), cross-field amplifier and Klystron (very high frequency oscillator based on an electron tube) for a transmitter, radar transmitters in the next decade will use solid state oscillators along with multi-element phased array systems.

Other important developments would include simultaneous acquisition and tracking of multiple airborne targets and multi-mode radars in navigation, estimation of altitude, terrain following, weapon guidance and target tracking, Dr Murthy said.

In the field of military radars, significant developments would take place in passive detection systems using infrared sensors and high resolution systems with millimeter and laser waves.

Developments in Gallium Arsenide technology would find an important role in the development of x-band waveforms with low peak power, high energy and long duration pulses.

Present-day radar systems are "horizon-limited". But the future would witness "over the horizon" radars that would be able to detect objects outside the line of illumination.

Seminar on Telecommunications Technology Reviewed

55500069 *New Delhi PATRIOT in English* 24 Apr 90
p 10

[Text] A two-day seminar on "technology Issues: The C-Dot Experience" was organized by IIT Delhi on April 20 and 21. About 100 engineers and scientists took part in the discussions.

Besides the academics and research scientists, engineers/managers from the Department of Telecommunications, C-DoT, C-DAC, Indian Telephone Industries and the manufacturers and vendors of the C-DoT Technology were present. A substantial proportion of participants were IIT professors and their ex-students who now occupy important positions in various Government and industrial organizations.

Dr N. C. Nigam, Director, IIT complimented the convenor Prof P. V. Indiresan for this opportunity for IIT to analyze and have a say in the induction of high technology in the country. A detailed analysis of the Indian telecom scene in the last 50 years was done, which showed that all along, India had been importing the telecom switching technology which was every time found to be unsuitable to the Indian conditions.

The seminar made a number of recommendations to the Government. Important among them were: it is absolutely necessary for India to develop its own technology and towards this end, the technical manpower, inspiring leaders and non-bureaucratic institutions have to be consciously nurtured and supported by the top leadership of the country. As the demand for telephones is very high, it was suggested that all electronic digital technologies available in the country should be put into production. Technical shortcomings, cost and time over-runs attributed to C-DoT are well within the normal limits of developmental projects all over the world; the experts said and that there was no need to import technology in this area any more.

All over the world, it takes 2,000 to 5,000 man-years (about 10 years) and \$ one billion to develop a new telecom technology. The normal life cycle of such technologies is about 40 years; it is a dynamic situation and

up-gradations have to be carried out every three to five years. There are about 10 Transnational companies which control the world market. The number of telephones have almost reached a saturation level in the developed world, thus these companies are directing their effort to capture the market of the developing countries, which is still expanding.

Only three countries in the world: South Korea, Brazil and India, are trying to come out of the stranglehold of the 10 Transnational and have their own telecom technology. The seminar was informed that Mr S. G. Pitroda who was being hounded in his own country, helped Brazil become self-reliant.

Engineers of the ITI factory at Mankapur said although theirs was the most modern digital Electronic Technology (E10-B) in India taken from France's CIT-Alcatel, internationally it was a 15-year-old technology.

Among the speakers in the seminar were S. M. Agrawal, member, Sarin Committee and ex-Secretary DoT, V. M. Sundaram and D. K. Sangal and C. P. Vasudevan, father of the Telecommunications Research Center in its early days and a World Bank consultant. The history, achievements and shortcomings of C-DoT were brought out in detailed and frank discussion took place. Pitroda, Meemansi and Mahajan were in the audience on both the days. The setting up of C-DoT and the two phases of the project were explained. The first phase, the so called "36 crore and 36 months" was described as the smooth phase in which all the targets were achieved. The 128 port EPABX and Rural Automatic Exchanges (RAX) are the by-products of the first phase. In the second phase ending March 1990, the C-DoT was supposed to develop and start production, through ITI, of its Main Exchange (MAX) of 20,000 lines and 8,000 Busy Hour Call Attempt (BHCA) capacity.

Project Manager, C-DoT K B Lal presented the work progress in C-DoT. He said that so far, C-DoT has used 400 man-years and about Rs 65 crore and that they were well on the way to delivering the state-of-the-art switching technology to the country within the next one or two years. Their use of the resources is a fraction of the international time and cost of development. Being an indigenous technology, it uses indigenous components and can always be upgraded. Actually, the upgradation experiments are already on in Ulsoor, Bangalore where a 512 port MAX is handling four times its call handling capacity by using the digital time compression technique.

Mr V. M. Sundaram, Chairman of the 1986 and 1988 review Committees of C-DoT, listed the present shortcomings of C-DoT MAX. He said: "it is not 40,000 lines and 800,000 BHCA; one RAX a day programme has fizzled out; the Remote Line Unit (RLU) and Remote Switching Unit (RSU) have not been developed; and RAX has not been interfaced with digital trunk telephones. Mr Pitroda had to get up from the audience and clarify each of these points:

—the Management Board and the Steering Committee of C-DoT had changed targets of MAX to 20,000 lines and 8,000 BHCA, because 90 per cent of the requirement of the country can be met with the revised specifications.

—the RAX programme was delayed because it was realized that ITI which was to manufacture them, did not have a production licence. Later, 11 private companies as well as ITI were given licenses and now 400 RAX have been delivered to the DoT.

—the RLU, RSU and digital interface were small items and they would be developed by the time the project is completed.

Mr Pitroda admitted that the second phase of the project was about one year or at the most one and a half year behind schedule. Mr Pitroda and Mr Sundaram suggested various ways to tide over the shortage of lines during this period. Mr Sangal sounded more cautious when he proposed the schedules of lab work, field trial, pilot production and regular production and induction into the national network, latest by 1993. It was clear that there was a lack of communication and understanding between the DoT (as represented by Sangal) and C-DoT. Mr Sangal emphatically declared that there was no question of importing any new technology, but C-DoT should draw up more realistic and firm plans and should be given more support to implement them.

The presentations by the manufacturers of C-DoT exchanges and the vendors of components showered praise on C-DoT. CDIL and NELCO representatives pointed out that C-DoT technology was much simpler and hence needed less capital equipment, was easy to learn (cost of training was smaller) and had a large market.

According to them, this was the hottest selling EPABX although three more systems with foreign collaboration are also in the market. It has the lowest cost per line. This exchange had already built up a capacity of seven lakh lines per year and a turnover of Rs 50 crore. A capital investment of Rs 200 crore has been made by these companies. They were all praise for the detailed documentation, trouble shooting support and constant upgradation provided by C-DoT.

Similarly, the vendors, 220 of them in the Small Scale sector, were impressed by the open and helpful culture of C-DoT. Their market has naturally increased, 6,000 jobs for technical persons have been created by the EPABX and RAX. They are looking forward to production of MAX in which also they will have a role because the components and cards are common.

The seminar revealed that for the first time a major project of telecom is working in a cooperative manner and can be called a national project of with a number of institutions like the Indian Institute of Science, Bangalore, Tata Consultants and TIFR who are providing help in software, CEERI Pilani in hybrid circuits and ICs and

IITs in software and parts of hardware. The seminar agreed that the different sizes of exchanges PABX (128p), RAX (2566p), MAX (5121, 1,600 and 4,500 ports) meet all the categories of requirements of the country. The design is simple (40 cards), modular and can always be upgraded. It was recommended that C-DoT which is not only an experiment in technology but also in management and work culture, should be nurtured and strengthened. The country needs more institutions like C-DoT, it was suggested.

Prof Indiresan was congratulated by all for organizing this seminar in which technologists of different disciplines could sit together, get factual data and have a frank exchange of views. They said that the seminar had cleared all the misinformation which had been introduced due to the excessive coverage of the work of this institution in the media.

Plans To Improve Indian Telephone System Outlined

55500066 Madras *THE HINDU* in English 26 Mar 90
p 8

[Article by N.N. Sachitanand in Bangalore]

[Text] Once upon a time the level of economic development of a country was gauged by the per capita consumption of steel or the population of automobiles or the total length of highways or some such figure. Today the figures quoted are telecommunications based—such as the number of telephone connections per capita, the percentage of network that is digital, the number of cellular telephones, the route kilometres of optical fibre cabling and the like.

India has never figured respectably according to the previous criteria. It fares even worse when weighed in the telecommunications scales. As of now the total number of direct telephone lines (DELs) is just around four millions, that is, less than 0.5 lines per 100 persons. The corresponding figure for developed countries is over 50 lines, for East European countries and the Soviet Union anywhere from 5 to 15 and for the newly industrialised "tigers" from 10 to 25. Only China is the other major economy whose telecom status is as poor as that of India with a DEL density of only 0.75 lines per 100 persons.

Even worse than the overall paucity of DELs in India is the skewed pattern of availability of telecommunications facilities. The rural areas, which account for nearly 75 per cent of the population, are served by just 10 per cent of the available DELs. The poor accessibility of telephones is highlighted by the fact that for an urban population of 200 millions there are just about 50,000 public call booths and it is no secret that at any given time half of them will be non-functioning.

Infrastructure and Manpower

All this would be pardonable if like the African countries or the Central American republics India had no infrastructure for manufacturing telecom equipment and no qualified manpower to design, install and maintain telecom networks. But India was a very early entrant to the telecom field—both in use as well as manufacture. The telegraph system was laid over 100 years ago and telephones made their appearance in the early decades of this century. More to the point, the large scale manufacture of exchanges commenced over 40 years ago, with the establishment of Indian Telephone Industries in Bangalore. As for technical manpower, with the rapid expansion of engineering education after independence, there never has been a shortage of that.

Why then, after such a fine start, did India lag so far behind in the telecom game? It frittered away the lead by remaining stuck with dated technology, investing timidly and sub-critically in network expansion, getting bogged down in low productivity-high cost manufacture in a monopoly Government facility, ignoring developments in services other than voice communications, etc. However, the biggest blunder made was according low priority to telecom development in the mistaken belief that telephones are luxuries not necessary for a developing country. Even as late as in 1984 when the Seventh Plan outlay for telecommunications was being finalised the planners were blinkered by this belief and savaged a modest outlay proposal of Rs 13,700 crores down to just over Rs 4,100 crores. The Department of Telecommunications had to take recourse to market borrowings of nearly Rs 1500 crores to salvage its expansion plan to some extent. Even then, at the end of the Seventh Plan we are still in the unhappy position of a large pent-up demand for DELs, a very low percentage of villages on the telecom grid, high fault rate in the cabling, most inadequate public call booth availability and generally poor reliability of the public network.

Ambitious Blueprint

So, where do we go from here? The Telecom Commission has prepared an ambitious blueprint for growth which envisages 9.5 million DELs installed by 1995 and 20 millions by 2000 A.D. which means an addition of about 16 million lines in the next decade. If we achieve that, we will reach a very modest figure of about 2 DELs per 100 Indians. Other important targets in the blueprint include an exchange or connection with trunk facility for every village and one million PCOs in the urban areas by the turn of the century. Both of these are very desirable since they will increase the accessibility of telephones to the general populace. In fact, the thrust of the perspective plan is on "accessibility, reliability and efficiency."

Perspective Plan for 1990-2000 AD		
	1995	2000 AD
DELS (millions)	9.5	20
Telex (thousands)	100	200
Villages with LDPT or RAX (thousands)	100	600
PCOs in urban areas (thousands)	200	1000
Voice/Data connections for business (thousands)	100	800

The blueprint also envisages gradual introduction of various services, other than voice communication such as Bureau fax, Remote Area Business Message Network, Packet Switched Data Network, Teletext, electronic mail, mobile telephone, etc. The final objective is the provision of Integrated Services Digital Network (ISDN) which will provide for digital transmission of voice, data, text and image on a common telephone channel at 64 kilobits per second. Towards this end the network is going to be progressively digitalised. The manufacture of electromechanical exchanges is going to be phased out in the next couple of years and further capacity will be only through digital electronic exchanges.

Do we have the manufacturing infrastructure to meet the Telecom Commission's targets? The only manufacturer of main exchanges (MAXs) and trunk exchanges (TAXs) is ITI. It has a capacity of 300,000 lines a year of Crossbar electromechanical switching system at its Rae Bareilly factory and 500,000 lines a year of the E-10-B digital electronic switching system of French design at its Mankapur factory in U.P. It also makes the E-10-B digital TAX at its Palakkad (Kerala) unit.

Which System?

Its main factory in Bangalore is now stopping the manufacture of the old electromechanical Strowger switching system. The plan here is to start making digital MAXs. What is holding up production is a decision about the system to be taken up. The original idea was to take up the E-10-B MAX but now with the indigenously developed C-DOT switch clearing most pre-production tests and trials it is likely that both the systems will come out of the Bangalore factory. In fact, ITI has decided to go in for a process oriented production system so that any of the two switches can be made. But the capacity utilisation that can be achieved under such a system, particularly with two very dissimilar switches like C-DOT and E-10-B, remains a matter of conjecture.

ITI is even planning to make a third system, the ILT switch, designed in-house. This fully digital switch is at present limited in capacity to a maximum exchange size of 2000 ports and uses a vintage microprocessor, the 8085 from Intel. ITI has now on the drawing board a bigger ILT switch suitable for a 16,000 port local MAX. It will use a new digital integrated circuit of VLSI (Very Large Scale Integration) category which has been designed in-house as well as the later generation of Intel

microprocessors such as the 80386. This DSS is likely to be ready for commercial production in another two years.

Between the E-10-B and the C-DOT switch, the latter is far superior in features. Its design is of the mid-Eighties while the French switch dates back to the mid-Seventies. The C-DOT switch has been designed with Indian conditions in mind such as high ambient temperatures. It uses HCMOS integrated circuits which generate far less heat than the bipolar chips used in the E-10-B. That is why the C-DOT switch can get by with air-cooling while the E-10-B exchange needs very stringent air conditioning. The E-10-B uses a number of proprietary integrated circuits which have to be imported at high cost while the C-DOT switch uses few types of off-the-shelf integrated circuits. It is estimated that the import cost per line of the E-10-B switch is around \$100 as against only \$50 for the C-DOT switch. The C-DOT switch is simpler in construction having only 35 types of PCBs and just two sizes as against 200 card types and several sizes for the E-10-B.

Perhaps the best argument for taking up the C-DOT switch in preference to the E-10-B is the lower investment and per line costs. For a 500,000 line a year MAX factory, the C-DOT switch needs an investment of only Rs 40 crores compared to over Rs 150 crores for making the E-10-B. The cost per line of the E-10-B from the Mankapur factory is at present over Rs 8,000 though with better capacity utilisation ITI expects to bring it down to Rs 6,000. It is also proposed to get a number of the proprietary chips manufactured by Bharat Electronics. The C-DOT system is expected to cost around Rs 4,000 to 5,000 a line. Facing a tight squeeze on its financial resources the DOT would definitely prefer to opt for a system which is cheaper and yet more modern. The C-DOT system is also designed with the ISDN services in mind while the E-10-B is not.

It is true that C-DOT's large MAX (16,000 ports) has still to cross some design and test hurdles before it is ready for commercial production. This is likely to come about by the end of this year. However, there is already an established capacity of around seven lakh lines a year of C-DOT's smaller exchanges (the 128 port PABX/RAX and the 512 port MAX) in ITI and other private sector companies. Since 80 per cent of the hardware of these exchanges is common to the large MAX, this manufacturing potential can be made use of when the large MAX goes into production next year. It is also necessary that sources of large exchanges alternate to ITI are created in the country. In this connection, C-DOT's plan to licence its large MAX to two more private sector companies with the needed credibility and resources is in the right direction.

Another aspect of the C-DOT switch is its export potential. All these years India has been an importer of telecom technology, particularly in the area of switching. Here now is a modern DSS designed from scratch wholly indigenously along with the operating software which

addresses itself to the infrastructural limitations common to developing countries. These are limitations of power, manufacturing and test equipment, availability of investment capital, trained manpower, etc. It is a flexible system that comes in a range of exchange sizes suited for small villages to busy metropolises.

Ideally Suited

It can be upgraded later for taking up higher traffic densities. These are qualities not usually found in the switching systems developed in the developed West. Therefore, the C-DOT switching system is ideally suited for developing countries who are on the verge of entering the telecommunication age but who would like to start with an inexpensive yet contemporary technology. A recent FINANCIAL TIMES survey indicated that the market growth rate in telecommunications between 1985-90 was the highest in Asia, Africa and Latin America. This trend is expected to continue in the next decade. India now has a technology of its own which it can market aggressively in these regions and at an advantage over the traditional Western suppliers of telecom technology. But unless India itself is not extensively using this technology how can it go about convincing others?

Recently, the C-DOT switch has drawn some criticism about its low BHCA (Busy Hour Call Attempt) rating. As against a promised rating of 800,000, the MAX on test at Bangalore has only reached about 130,000. What exactly is the significance of BHCA rating? It is a measure of the maximum traffic density handling capability of an exchange. Just as road traffic fluctuates at a junction during the day, so does telephone traffic at an exchange. An exchange must ideally be capable of handling the peak traffic so that there is no system breakdown at that time leading to traffic jams. This maximum traffic handling capacity is denoted in terms of the number of call attempts per hour that the exchange can handle.

Current generation digital switches in the West can typically handle 500,000 BHCA. The E-10-B can handle only 300,000 BHCA. Normally, such peak loads are experienced only in busy commercial areas of large cities. Therefore, if the C-DOT switch is capable of only 130,000 BHCA, it does not mean it is unsuitable for the whole of the country but only in the business districts of certain metropolises like Bombay, Calcutta, Delhi, Madras and Bangalore. Then again, the world over, the BHCA of switching systems is gradually improved over the years by making the software more streamlined, increasing switching speed by using more powerful processors and faster memories and other such measures. The C-DOT switch has just been introduced. Over the years, with feedbacks from service experience, there is no reason why its BHCA should also not reach the 500,000 to 800,000 levels.

Cost Reduction

A major hurdle to meeting the telecom targets for 2000 A.D. is the paucity of funds. In a recent article in

ECONOMIC TIMES, Mr B.G. Talloo has worked out that for the Eighth Plan alone, the outlay needed will be around Rs 26,000 crores based on an investment cost of about Rs 32,000 per direct exchange line (DEL). This, perhaps, is based on deploying only the E-10-B system. He has indicated that the costs can be reduced by going in for C-DOT switches, using cables with smaller gauge conductors in areas where the exchange is within 5 km of the subscribers, deployment of computerised network management for system optimisation, etc. He estimates that all such measures can bring down the investment cost per DEL to Rs 25,000.

During the last Plan, in order to meet partially its investment commitments, the DOT took recourse to market borrowings which are reported to have touched Rs 1,550 crores. Frightened by the burden of debt servicing, which has risen to Rs 220 crores per annum, the Department chose this year to raise investment resources by raising tariffs. This is a retrograde step. The world over, telecommunication tariffs, particularly the STD rates, are being brought down and a host of new services being provided to subscribers.

Counterproductive Strategy

The DOT's strategy is counterproductive. Instead, it should aim at generating revenue by extracting the maximum from each installed DEL. One way is by creating confidence in the public that the STD facility cannot be misused in the exchange by connivance of unscrupulous staff. Provision of computerised detailed billing, now possible in digital exchanges, is one answer to this crisis of confidence. Mr Talloo points out in his article that 62.4 per cent of the subscribers in Delhi and 40 per cent in Bombay have barred STD facilities from their connections.

Instead of increasing the rate per local call and reducing the number of free calls, the DOT could have generated more revenue per DEL by just introducing a time limit, of say three minutes, for each local call. Since there is a general tendency to indulge in long duration local calls this tariff change would have meant more money for the Department when the phone is being used for a local call.

Another reason why the revenue per DEL is low is the high fault rate which results in a high percentage of incomplete calls. Every incomplete call is revenue lost. Then again, with the increasing digitalisation of the telecom network, it should be possible to offer a range of non-conversational services to the subscriber so that he uses his connection more and the Department earns more from his line. That is the trend the world over. The FINANCIAL TIMES survey referred to earlier shows that the world market for value added network services (information services, processing, messaging, etc.) is expected to grow from \$14 billions in 1989 to \$39 billions in 1995. Of course, for this to take place there has to be a decided spurt in the computerisation of business and the integration of computers and communications in both areas, India is still a laggard.

The PCO is another neglected revenue earner of the DOT. If it is in proper working order, its usage is far higher than a private DEL. While the telecom blueprint

rightly emphasises increasing the total number of PCOs, particularly PCOs with STD facility, the maintenance of the existing ones leaves a lot to be desired.

Broadcast Minister Opens Tamil Nadu Regional Service

55500067 Madras *THE HINDU in English* 26 Mar 90
p 7

[Text] Madras, 25 March—Tamil Nadu became the third State in the country, after Maharashtra and Andhra Pradesh, to have a full-fledged regional service with the linking of all the transmitters and transponders in the State to provide a three-and-a-half hour programme from the Madras Doordarshan Kendra.

This extended service was inaugurated at a function here this afternoon by the Union Minister for Information and Broadcasting, Mr P. Upendra, in the presence of the Tamil Nadu Chief Minister, Mr M. Karunanidhi.

In a chat with newsmen after the programme, Mr Upendra said the uplink had been provided in Tamil Nadu with the help of ARABSAT. Though there was a proposal of offer a similar full-fledged regional service to Karnataka and Orissa, it had to be deferred for want of satellite time.

The Minister said that even INSAT I-D would only help replace INSAT I-B and, as such, the country would have no extra time available for these links.

He said the Ministry had approached the Planning Commission with a Rs 700-crore plan to provide a second channel in 16 State capitals in the country, including Trivandrum, Bangalore and Hyderabad.

Mr Upendra said work on a second production studio for the Madras Kendra had been sanctioned and this would be taken up at a cost of Rs 10 crores.

Local level radio stations: In All India Radio, the Minister said, the concept of local level radio stations had been introduced and nearly 30 stations had been commissioned. It was planned to put up 80 to 90 such stations, taking the total number of AIR stations to 200 in three months.

Answering a question he said that viewers in Tamil Nadu would hereafter see films being telecast from Madras on Saturdays and Sundays.

Full-fledged regional service: Inaugurating the full-fledged regional service at a function in the TV centre, Mr Upendra said it came into being out of the Government conviction that the demand for such a telecast had to be met immediately. The emphasis would be on programmes in regional languages.

The Minister said that owing to the overlapping of regional programmes in the two channels available in the four metropolitan cities. Doordarshan had introduced features for linguistic minorities in the second channels

from 7:30 p.m. to 8:30 p.m. Bombay had been asked to telecast Gujarati and south Indian language programmes, Delhi, Bengali and south Indian languages. Calcutta, Oriya and Nepali and Madras, Kannada, Telugu and Malayalam during this hour.

Mr Upendra said the National Front Government believed "no matter how enlightened the Government is, any control would, by definition, be an encroachment on the free flow of information and ideas." "We have in the recent past seen the brazen and uninhibited misuse of electronic media for narrow and partisan purposes, resulting in the total destruction of their credibility. The Prasar Bharati Bill had been introduced to prevent such a situation."

Winds of change, says C.M.: The Chief Minister, Mr. M. Karunanidhi, thanked the Union Minister and Doordarshan for fulfilling the demand of Tamil Nadu and said that he was able to "see, hear and experience" the winds of change in Doordarshan's telecast.

Mr Karunanidhi said it was the first time he was participating in a television function and this was because of the "new political culture" ushered in by the V.P. Singh Government with Mr Upendra as Information Minister. He recalled that though the State Government during his previous tenure had offered the land and other facilities for setting up the Madras Doordarshan Kendra in 1975, he, as Chief Minister, was not invited for its formal inauguration on 15 August that year.

The Chief Minister noted that from April onwards, the State would be celebrating the birth centenaries of Dr Ambedkar and Bharathidasan and appealed to the Doordarshan to produce programmes that would bring out the equality of all communities as advocated by these stalwarts and put down communalism or projection of any particular community.

Another landmark: Welcoming the invited audience, Mr S.K. Kapoor, Director-General in-charge, Doordarshan, said the full-fledged regional service for Tamil Nadu marked another landmark in Doordarshan history.

Mr O.P. Kushroo, Engineer-in-chief, Doordarshan, said a three-tier telecast system had been introduced in five States.

Tentative Schedule for 1990-91 Television Projects

55500072 Bombay *THE TIMES OF INDIA in English*
16 Apr 90 p 6

[Text] New Delhi, April 15 (PTI). The government has prepared a tentative schedule for commissioning 54 television projects in 22 states and Union territories during 1990-91, according to official information available here.

Besides, Doordarshan's 1990-91 annual plan provides for the setting up of nine high power (including four for second channel service) and 25 lower power/very low

power transmitters, the locations of which will depend upon the priority for extension of TV service to uncovered parts of the country.

Of the 54 new projects, one will be located in Andhra Pradesh, four in Assam, one in Arunachal Pradesh, three in Bihar, one each in Himachal Pradesh and Goa, ten in Jammu and Kashmir, three in Karnataka, six in Madhya Pradesh, two in Maharashtra, two each in Manipur, Meghalaya, Mizoram, Nagaland, and Orissa.

Uttar Pradesh will have five new projects, while Rajasthan, Sikkim, Triura, West Bengal, Pondicherry and Andaman and Nicobar Islands have one each.

In Andhra Pradesh, a high-powered transmitter (HPT) is scheduled to be set up in the Anantapur district. In Assam, studios will be set up at Silchar, Dibrugarh and Guwahati and a programme production and feeding center at Guwahati.

In Arunachal Pradesh, the new studio will be commissioned at Itanagar in the lower Subansiri district.

In Bihar, production generation facility (PGF) will be set up at Muzaffarpur and Daltongang and high power transmitters in Daltongang and Katihar.

Himachal Pradesh will have a transposer at Rajgarh in Sirmaur district, while Goa will have a programme generation facility at Panaji.

In Jammu and Kashmir, very lower power transmitters will be commissioned at Kilhotran (Doda district), Nyama, Deskit, Timsogam (Leh district), Dras, Sankoo, Padam (Kargil district), transposer at Surankot (Poonch district) and Nagrota (Jammu district) and a programme generation facility at Jammu.

Karnataka will have a programme generation facility at Gulbarga and high power transmitters at Dharwad and Shimoga.

In Madhya Pradesh, a studio will be commissioned at Bhopal, programme generation facility (PGF) and high-power transmitter at Raipur, high-power transmitters at Gwalior, Jagdalpur and Jabalpur.

Maharashtra will have high power transmitters at Aurangabad and Ambejogai (Bir district).

Manipur will have a high power transmitter at Churachandpur in Manipur south district and a studio at Imphal in Manipur central district.

In Meghalaya, studios will be commissioned at Shillong (east Khasi Hills district) and Tura (West Garo Hills).

Mizoram will have a high-power transmitter at Lunglei and a studio at Aizawl. In Nagaland, a studio will be set up at Kohima and a high-powered transmitter at Mokochung.

In Rajasthan, a lower-powered transmitter will be commissioned at Salumber in Udaipur district. Sikkim will

have a high-powered transmitter at Gangtok. Tripura will have a studio at Agartala in West Tripura district.

In Orissa, a high-powered transmitter will be commissioned at Bhawanipatna in Kalahandi district and a studio at Bhubaneswar in Puri district.

In Uttar Pradesh, a very low power transmitter will be commissioned at Munsiri in Pithoragarh district, a high-power transmitter at Bareilly in Bareilly district, a lower power transmitter at Hardwar in Saharanpur district, and a transposer each at Mussoorie (Dehra Dun district) and Churk (Sonbhadra district).

In West Bengal, a transposer will be commissioned at Tiger Hill in the Darjeeling district.

In Pondicherry, a programme generation facility will be set up at Pondicherry.

In Andaman and Nicobar Islands too, a programme generation facility will be set up at Port Blair, according to information provided by the information and broadcasting ministry to the Lok Sabha this month.

IRAN

President on Development of Telecommunications

*LD1705112790 Tehran Domestic Service in Persian
1030 GMT 17 May 90*

[Text] On the occasion of International Communications Day, today Mr. Hashemi-Rafsanjani, the president, attended the gathering of officials from the Post, Telegraph, and Telephone (PTT) Ministry, directors-general of that ministry from various parts of the country, staff from the country's Communications Organization, and managers of communications production companies. In that meeting, he described communications as the central nervous system of the society in its role in good management of affairs, and in speeding up and facilitating the execution of tasks. He said: Every week and every month our people witness the inauguration of a new telephone exchange center in the country. And in view of long distances and problematic transport route, the services of the Communications Organization are worthy of praise.

Mr. Hashemi-Rafsanjani then pointed that during the reign of the past regime 800,000 telephone exchanges were provided to the people, whereas in 10 years after the revolution, the figure reached 2,500,000 telephone lines. Further, within the course of the Five-Year Plan the same number of telephones will be provided. Addressing the staff present, he said: this requires a basiji [mobilization] type of movement, and you do have the ability to carry out such a task. The president added: Today the policy is that the country's resources should be evenly divided among the provinces, and for that purpose, the presence of the Islamic revolution in remote areas can be felt to a greater extent. He then pointed to

the cheap rate of government services, including telephones, and said: in addition to the manpower and rial costs, every telephone line costs \$2,000 in foreign currency. The efforts of the offspring of this nation in the Communications Organization is a good example of utilization of world's advanced technology in the service of people.

According to the same report, the PTT minister Mr. Gharazi in that meeting presented a report about the performance of his ministry during the last ten years. He said: Before the victory of the Islamic revolution, there was only one telephone line for every 20 people. At present the zero digit, needed for inter-city communication, is available up to 85 percent [as heard]. Further, problems in telephone communication will be resolved before the end of the current year [ending 20 March 1991]. He added: From the beginning of 1363 [21 March 1984-20 March 1985] onwards, the Communications Organization has become self-sufficient as far its budget is concerned. This year it will help the government budget with a sum of 50 billion rials.

ISRAEL

'Amos Communications Satellite Project described

90WT0077A Tel Aviv QESHER, ELECTRONIQA, MAHSHAVIM in Hebrew Jan 90 pp 4, 5

[Article by Dr. Menashe Simhi] txt
[Text]

Introduction

The aviation industry, in cooperation with foreign companies, has recently begun to develop the first Israeli communications satellite, designated 'Amos. If all goes properly, this satellite will be launched in 1992. The following is a brief survey of the 'Amos project.

The Needs of the State of Israel

Israel's vital need for a communications satellite was examined by a number of committees that were established by the Communications Ministry in cooperation with the Bezeq Company. It became clear that a communications satellite was in fact the cheapest, best solution to meet many needs. Israel currently uses satellite communications for domestic purposes and international communications. In 1986, Israel acquired from the Intelsat organization three transponders designated solely for domestic communications purposes. These transponders broadcast the transmissions of the Second Television Channel [a state channel] and transmit data and telephone communications to remote places.

Israel's main requirements of a communications satellite are:

- The transmission of television broadcasts to regional stations for the Second Channel of state television

(and regional transmissions from the First Station in the second phase as well).

- The broadcast of television programs to regional stations for pay television stations.
- The broadcast of television transmissions directly to homes (DBS) through the use of home reception antennas 0.5 meters in diameter.
- The transmission of data/information on private networks of the VSAT type.
- The transmission of television from the scenes of events to one central station through the Bezeq Company's mobile stations.
- Support of communications nodes in the ground network, including mobile nodes.
- Special solutions for communications in established and new settlements, or in remote areas.

The 'Amos Project

The 'Amos satellite, which will be planned and built by the aircraft industry and foreign companies, is a small, hybrid communications satellite adapted to the needs of the State of Israel. The satellite will make it possible to provide services to meet the needs defined above. The companies developing the satellite envisage the possibility of selling small satellites of this type to medium and small states.

General Specifications of the 'Amos

- Projected life span: 10 years
- Stabilization: Triaxial
- Electric power supply (under conditions of full operation when the sun is hidden from the satellite by the earth, which occurs in spring and fall for a maximum of 72 minutes in a 24-hour period over a period of about 20 days): 600 watts
- Launch vehicles: Ariane-4 (an initial agreement was signed in 1988 with Arianespace to obtain a place in line to launch two 'Amos satellites together in 1993)
- Weight at launch: 1,500 kg (includes both satellites)
- Dimensions of satellite body: 2 x 2 x 0.8 meters
- Transponders: KU 4 to 8 active (2 to 4 additional); band width of 72 megahertz per transponder.
- Peak power capacity: KU 20 watts per transponder
- Areas of coverage: KU Fixed beam on Israel, aimed beam on Europe
- Stabilization accuracy: +/- 0.1 degrees

Understanding the Operation of the 'Amos System

a. The Space Section

The space section will contain two satellites, moving in a geostationary orbit above the equator on a longitude line 15 degrees east. One of the satellites, which will be defined as an operational satellite, will supply communications services to the State of Israel according to the demands defined regarding it. Part of the payload in the second satellite will be used to provide communications services to other states. For this purpose, the beam of the

aimed antenna will be directed at a given state, and the transponders will be activated in accordance with that state's needs.

b. Ground section

The ground section of the 'Amos system contains three types of stations:

- The main satellite command and control station.
- The main command and control station of the communications channels.
- Border stations (for broadcasting and reception, or reception alone).

General Description of the Satellites

The body of the satellite is a composite cube; the vertical section of the satellite body is rectangular, whereas the horizontal section is octagonal (see sketch 1).

A high thrust engine is mounted on the bottom of the satellite. It moves the satellite from a transit orbit to a geostationary orbit. On its upper surface are mounted an antenna in the KU area, a mast with feeders, and earth and sun meters. The broad sides of the satellite body form thermal radiators, on which the rotation mechanisms of the solar panels are mounted. These sides of the body (the wide facets) face toward north-south, in relation to the earth, so that the satellite is located in a geostationary orbit.

The wide facets are cold, because they virtually do not face the sun.

The satellite structure is modular and made of honeycomb panels reinforced with an overlaying of reinforcement panels. A cylinder containing two fuel tanks is mounted in the center of the structure.

The precise guidance of the satellite is carried out with the help of momentum wheels, low-thrust engines, and a navigation system based on the use of sun-meters, earth-meters, and gyroscopes. The satellite's computer (data processing system) is tasked with deactivating control dials and processing the data received from the sensors. Every subsystem of the satellite is operated by electricity generated with the aid of extended solar panels. In order to ensure the orderly operation of the satellite when absorption of the sun's rays is partial or nonexistent (when the sun is eclipsed by the earth), the satellite contains charged accumulators.

Control of the guidance of the solar panels and control of the panel spinning mechanism is performed by a solar array drive electronics system (SADE).

The payload of the satellite, which includes transponders and accompanying systems, is mounted on the back of the large facets of the body, near the antenna surface. The fact that the large facets are thermal radiators permits the control of the temperature of the payload and the maintenance of this temperature within reasonable limits.

All of the satellite systems are connected to the satellite's computer (data processing system), through which the ground station transmits orders to activate the subsystems and receives their telemetry.

The satellite's computer (data processing system) is also connected to the receiver and transmitter of the command-tracing-telemetry system, through which information flows to and from the satellite.

Launching and Entry Into Orbit

The launch vehicle brings 'Amos to a geostationary transit orbit; the point of injection is located at the perigee of the base orbit. The altitude of the perigee is 185 km and the altitude of the apogee is 35,786 km above earth's surface.

Sketch 2 [not included] details the orbital entry sequence with a midnight launch window.

1. Entry into geostationary transition orbit.
2. Separation between the two satellites and linkage with the ground station.
3. Acquisition of the sun and deployment of the panels.
4. Acquisition of the earth and the start of gyrocompass.
5. Activation of the high thrust engines to change orbit.
6. Completion of high-thrust burning.
7. Return to EP position and drift to 15E position.

The Production of the 'Amos in Israel: Its Contribution to the Space Industry in Israel and Its Consolidation

Israel, the aviation industry in particular, has the ability, infrastructure, equipment, and manpower needed to develop satellites of the 'Amos type. The successful launching of the Ofeq-1 substantiates this claim.

'Amos is a small, unique communications satellite tailored to the needs of the State of Israel and designed to be a competitive export product. The aviation industry made an effort to find the unique, systems solutions needed for a small satellite like 'Amos. The aviation industry believes that the 'Amos project will lay the basis for the space industry in Israel, propel it forward, and bring it to a level of maturity that will allow it to enter into commitments with foreign companies and develop products for export.

Summary

Israel has a need for satellite communications that will grow with time. The technical risks entailed by the development of a communications satellite are not especially high. The launching of the Ofeq-1 testifies to the technological level of the aviation industry in this regard.

The relatively high power of the 'Amos satellite, in the area of KU (EIRP 54 DBW) will grant an advantage

regarding the size requirement of the ground stations, which has a direct bearing on price. This advantage becomes clear in comparing the diameter of the antennas needed to communicate with the Intelsat satellite versus

the 'Amos: The Intelsat requires an antenna with a 1.8-meter diameter, whereas, for an identical connection, the 'Amos requires only a 0.8-meter ground antenna.

EUROPEAN AFFAIRS

FRG Minister on GDR TV Prospects

LD0406175390 Hamburg DPA in German 1628 GMT
4 Jun 90

[Excerpts] Berlin (DPA)—According to Federal Post Minister Christian Schwarz-Schilling (Christian Democratic Union), there will be no room for more public broadcasting television channels in a unified Germany. Anyone speculating that the present two GDR television channels will be introduced as the fourth and fifth public broadcasting channels for the whole of Germany "will definitely be disappointed," Schwarz-Schilling said in an interview with 'BILD' newspaper (tomorrow's edition). He spoke in favor of giving free frequencies to private broadcasters. [passage omitted on background]

He assumed that in the GDR there will be frequencies for five television channels. "Two of them must be given to private companies."

Asked about the future television scene in the GDR, Schwarz-Schilling said that in the GDR cultural authority will also lie with the laender to be formed. "Therefore television will also have to be federally regulated by laender authorities, which could be integrated into the ARD [working group of FRG broadcasting institutes]." [passage omitted]

FRG-CSSR Joint Venture for Production of Digital Telephone Equipment

90wt0100 Paris LE MONDE in French 6 Jun 90 p 21

[Summary] On 4 June 1990 in Prague, partly as a result of the relaxation of COCOM restrictions, SIEMENS of West Germany and the Czech firm TESLA KARLIN announced the signing of an accord for the production of digital telephone exchanges in Czechoslovakia. The contract, slated to go into effect in September, calls for the joint production of telephone systems to begin in 1991, for serving an initial quota of 350,000 customers and 500,000 customers annually thereafter. Turnover could vary between DM 50 million and DM 80 million. SIEMENS, which envisions investing DM 20 million, will provide the technological know-how, will train the Czech engineers and technicians and will have a 40 percent share in the venture. On the Czech side, TESLA KARLIN will eventually be exporting 60 percent of its production to the Soviet Union.

CANADA

Telesat Unveils Mobile HDTV Production Studio

55200039 Toronto THE GLOBE AND MAIL
in English 25 Apr 90 p B22

[Article by John Partridge]

[Excerpts] If what is being billed as the next revolution in television finally makes it to your screen sometime late this decade, Telesat Canada will be set to roll—literally.

Telesat, the only Canadian operator of communications satellites, yesterday unveiled a \$5-million mobile high-definition television—HDTV—production studio built into a tractor-trailer rig, the first of its kind in Canada.

The mobile is the centre-piece of a \$10-million, two-year program of research and development into advanced TV that Telesat, based in Ottawa, kicked off last fall. The company unveiled the rig at Toronto's Sky-Dome stadium.

It plans to rent the mobile to broadcasters and TV production houses across Canada—and possibly in the United States—for \$9,000 a day so that they can familiarize themselves and produce shows with the new format. [passage omitted]

Telesat officials said the firm is trying to kickstart HDTV's growth in Canada partly because retransmitting broadcast signals via the firm's five satellites accounts for about 60 percent of its revenue and it does not want to get left behind.

The company still is awaiting approval for its proposed \$9,000-a-day rate from the Canadian Radio-Television and Telecommunications Commission, Peter Pleckaitis, manager of the two-year trial, said after the news conference.

Mr Pleckaitis said the rate is marginally higher than those broadcasters charge for the conventional TV production mobiles some of them own. It also is far less than the \$25,000 (U.S.) to \$30,000 he said is being charged for less-sophisticated HDTV mobiles in the United States.

Telesat has hired Dome Productions, which handles TV productions at the Sky-Dome, to operate the mobile. Dome Productions vice-president and general manager Brian Ross said the contract will be worth about \$500,000 (Canadian) to the company over the next two years.

He also said there will be a considerable "learning curve" on HDTV.

One main difference is that the screen is a different shape than that for conventional TV. It is almost twice as wide as it is deep, much like a movie-theatre screen.

This means each TV camera covering a baseball game, for example, will be able to show much more. "You could be focused on the pitcher but still see a player stealing second base," Mr Ross said.

Telesat has signed its first commercial contract for the mobile. Tokyo Hi-Vision and NHK Enterprises U.S.A., divisions of Japan's national broadcast company, will use it to produce a show at a children's festival in Vancouver next month.

Canada's 16 biggest telephone and telecommunications companies own about 50 per cent of Telesat. The balance is owned by the federal government, although Finance

Minister Michael Wilson announced in his February budget speech that the government wants to sell its stake.

Telesat spokesman Murray Long said yesterday that the company had had no formal communications with the federal government's privatization secretariat.

Ottawa may be holding back on selling its stake in Telesat because the company is scheduled to launch two new satellites next year. And whether the government decides to sell out through a share issue or, lock, stock and barrel to a corporate buyer, it might have trouble nailing down a deal before the costly satellites are up and running successfully.

Telesat Nets Record Profit, Privatization Process Continues

55200042 Ottawa THE OTTAWA CITIZEN in English
2 May 90 p F14

[Article by Peter Moreira]

[Text] Canada's satellite operator has reported record profits—which is good news for its largest shareholder, the federal government.

Ottawa plans to sell its 50 percent stake in Telesat Canada. And company should be more attractive after reporting Tuesday that profits from operations rose 15 percent to \$21.7 million in 1989 from \$18.9 million in 1988.

The annual report of the company—which sells satellite services to such enterprises as phone companies and television networks—shows revenues rose 14 percent to \$146.5 million from the 1988 mark of \$129 million.

"We're pleased that it's doing so well," said John McDermid, the minister for privatization. "(But) it hasn't speeded up or slowed down the process (of the sale)—we're following the regular procedure with it."

The government announced in the February budget it plans to sell its Telesat shares. And McDermid said in an interview he hopes the sale can take place in this fiscal year, which ends March 31, 1991.

The company—whose remaining shares are owned by Bell Canada, other telecommunications firms and some of Telesat's 860 employees—welcomes the sale.

"I think the aura of being government-owned has been a handicap to us in the marketplace," Eldon Thompson, president of the Ottawa-based company, said in an interview.

"And secondly, there are some things we do that under our act, because of the government ownership, tend to be very cumbersome."

McDermid said the government is working on procedural matters on the sale but has not yet decided whether the stake will be sold to one party or as shares to the public.

Although predicting Telesat's 1990 profits will be about the same as last year, Thompson warned all is not roses with the company that's been operating satellites for 21 years.

First, the Canadian Radio-television and Telecommunications Commission has rolled back the company's rates, which will cost Telesat \$7.5 million in 1990. Second, there is increased competition from other companies that carry telecommunications and broadcasting signals.

Telesat will ask the CRTC, the federal telecommunications regulator, in June for a 17.3 percent rate increase in the first year of a new fee-structure. The increase is needed, it says, because it is raising money to launch its sixth and seventh satellites in 1991.

CNCP Telecommunications Changes Name to Unitel

55200041 Toronto THE GLOBE AND MAIL
in English 10 May 90 p B20

[Text] CNCP Telecommunications will now do battle against the telephone companies as Unitel.

The Toronto-based telecommunications carrier that competes in the business services market unveiled its new name at press conferences held simultaneously yesterday in Ottawa, Montreal, Vancouver and Toronto.

The new name was required because of a change in ownership of the CNCP partnership more than a year ago, when Crown-owned Canadian National Railways sold its stake to Toronto cable magnate E. S. (Ted) Rogers. Rogers Communications Inc. owns 40 per cent of Unitel and Montreal-based Canadian Pacific Ltd. owns the remaining shares.

George Harvey, Unitel president and chief executive, said the company chose the name "because 'uni' denotes universal telecommunications and united for national unity."

He said Unitel would submit its long-awaited long-distance competition application to the Canadian Radio-Television and Telecommunications Commission this month. It is expected to be filed next week.

Mr Harvey said Unitel will invest \$1.5-billion in the next five years to compete in long distance, but he refused to give more details until the company submits its application.

TTI Telephone Technologies Marketing Foneguard

55200044 Vancouver THE SUN in English 8 May 90 p D5

[Article by David Smith]

[Text] A small West Vancouver-based company that developed a telephone call restrictor device has lined up some big customers, including Radio Shack, J. C. Penney and B. C. Tel.

Clive Ross, president of TTI Telephone Technologies Inc., said Monday that negotiations are also underway with ITEC Inc. of Huntsville, Ala., which supplies complete telephone systems world-wide, and ETI Electronic Technologies Inc., the company he owns which holds the rights to the Foneguard call restrictor outside North America.

The talks cover the exclusive rights to market the restrictor in India, Bangladesh, Sri-Lanka, Pakistan and Indonesia. The opening contract will see TTI supply ITEC with 100,000 units, worth about \$2.5 million US.

TTI has already sent 2,000 units to Intertan Canada Ltd. which will sell the units at its Radio Shack outlets across Canada and is close to completing a deal with Tandy Corp in Texas to sell Foneguard at 7,000 Radio Shack outlets in the U.S.

That deal will involve 20,000 units, worth about \$1.4 million U.S. Additionally, said Ross, J. C. Penney Co. has approved the unit for sale at its outlets.

"We've got a lot on our plate right now," he said.

Foneguard, developed by Ross over three years with the help of a \$50,000 B. C. government loan, is a small plug-in box that can be programmed by the user to restrict up to nine local or long-distance calls.

The unit can prevent family members from calling sex-by-phone services or stop employees from calling long-distance.

Powered by four AA batteries, the Foneguard can replace an existing wall jack and be programmed from the telephone.

The product is made under subcontract by Electronic Manufacturing Corp. in Redmond, Wash., Ross said, but talks are underway to locate the manufacturing in Canada.

Possible manufacturers here include Pachena Industries Ltd., part of the B. C. Tel Group, and a Saskatchewan firm.

"We're looking to see if it can be done in Canada," he said, adding that quality control is an important consideration for the company.

Major Canadian telephone companies have shown little support for the product, possibly because it does restrict long-distance calls, Ross said.

However, B. C. Tel has ordered 300 units and is selling them through the phone marts, he said.

Incorporated 30 months ago, TTI went public last June on the Vancouver Stock Exchange at 52 cents. It traded Monday at 82 cents.

Bell-Northern Research Laboratory Opening, Expansion

Optoelectronics Laboratory Opening

55200047 Ottawa THE OTTAWA CITIZEN in English
17 May 90 p C1

[Article by Dominique Lacasse]

[Text] Light, not electricity, will run the next generation of telecommunications equipment.

Light is a faster and cheaper way of moving information than conventional electrical impulses, say Bell-Northern Research officials.

And Bell-Northern's new \$30-million "optoelectronics" lab, officially opened Wednesday at the company's Carling Avenue and Moodie Drive complex, will ensure Bell-Northern stays at the forefront of that bright new world, say officials.

Bell-Northern is the Nepean-based research arm of Northern Telecom and Bell Canada.

Research at the lab will light the way for Northern Telecom and Bell, said David Vice, Northern-Telecom's vice-chairman of products and technology, during the opening ceremony.

"Optical technology will transform dramatically today's copper-based telecommunications networks into fiber-optic superhighways of the 1990s and beyond."

The lab will be used to develop new materials and products, such as semiconductor lasers, used in fiber-optic communications and high-speed electronic circuits made with gallium arsenide.

The 64,000-square-foot facility is the largest optoelectronics research lab in Canada, says Bell-Northern spokesman John Hewer.

But only about one-third of the area will be used by the 100 researchers staffing "Lab Four."

Lab Four is like a giant, air-conditioned, vacuum cleaner mounted on a Cadillac suspension. Though three-storeys high, only one floor is lab space. The rest of the space is devoted to ensuring the labs are "clean rooms," virtually dust-free environments required for the delicate procedures used in producing microcircuits.

It is a "building within a building," said spokesman Michael Salter during a tour of the lab. The idea is to "minimize vibration and maximize cleanliness."

The lab area effectively floats on a vibration damping mechanism that keeps vibrations down to less than one-tenth of micron. (A human hair is 25 to 100 microns thick.)

The air in the clean rooms is up to 10,000 times cleaner than in a typical office building, said Salter.

All the air in the lab is replaced every seven seconds by a massive circulation system that forces the air through a maze of stainless-steel ducts and pricey filters. Floors and ceilings are effectively giant vents, and even the tables are full of holes to encourage air flow.

\$120 Million Facilities Expansion

55200047 Toronto *THE TORONTO STAR* in English
17 May 90 p B3

[Article by Jonathan Ferguson]

[Text] Ottawa—Canada's leading high-technology company is launching a \$120 million expansion of its laboratory facilities.

Northern Telecom Ltd chairman Paul Stern made the announcement yesterday during a ceremony dedicating the firm's new \$30 million fibre optic telecommunications systems laboratory.

Construction of the new facility, part of Northern's research and development subsidiary, Bell-Northern Research, will begin this summer. The 600,000-square-foot (55,800-square-metre) project has a 1992 completion date.

The latest expansion brings Northern's total capital investment at the research and development complex to \$500 million.

"The expansion reinforces Northern Telecom's unwavering commitment to continued global product leadership through cost-efficient, market-focused research and development," Stern said.

"Our vision of attaining global leadership in telecommunications products by the end of the decade is predicated on such investments."

The new facility will allow 2,200 Northern employees now spread throughout the Ottawa-Carleton region to join another 2,200 employees already working on the site.

Stern said there will be no layoffs or plant closings as Northern continues to streamline its worldwide operations.

David Vice, Northern vice-chairman, said much of the new facility will house systems designers and software developers working on new product lines.

"Northern Telecom's product and technology leadership on digital telecommunications has been based on our strategic development of vital technologies," he said.

"The new facility announced today underscores our FiberWorld pledge to transform dramatically today's copper-based telecommunications networks into fibre-optic superhighways of the 1990s and beyond."

The recently launched FiberWorld is a new product family for telephone calls and computer data that

Northern hopes will pave the way for it to leap ahead of its international competitors.

Northern is Canada's largest spender on research and development.

Northern Telecom Refines Teleconferencing System

55200050 Toronto *THE TORONTO STAR* in English
29 May 90 p E3

[Article by James Daw]

[Text] A new generation of equipment promises to make it easier to run group meetings by telephone, and keep phone companies ahead of the growing demand.

Northern Telecom of Mississauga has announced refinements to its MS-1 teleconferencing system, the basis for the TeleForum service launched by Bell Canada in late 1987.

Canada's largest telephone company, a sister company of Northern Telecom, has held a one-month trial and reports an excellent customer response to the changes.

"Customers said they found it more understandable," said Janet Hugli, a TeleForum product manager.

The most noticeable change for customers is that recorded voice messages will replace tones and beeps now used to notify callers about the status of their conference calls.

But the phone companies around the world that Northern Telecom wants to buy its equipment are promised a number of operating efficiencies and service enhancements.

For example, the new equipment and computer software package will permit Bell Canada to run the whole TeleForum service in Ontario with one team of operators in Ottawa.

New modules can be added as demand grows and features changed quickly.

Teleconferences between three or more parties date back to the 1930s. But as the phone network has improved, the number of group calls for everything from Mother's Day celebrations to multinational sales meetings have been rising at double-digit rates.

"We believe the market is set to explode," said Michael Kemp, development manager of Northern's Network Applications Division in Ottawa, which is responsible for the MS-1 system.

Northern expects to sell about 10 MS-1 systems in Canada over the next two years, but will not disclose the cost. Prices vary according to the size of system and features.

Bell will also not disclose the number of conference calls it handles each year, not wishing to help two competitors, Darome Connection and Confertech Canada Inc.

An official would only say that Bell has about a 95 per cent of a market that is growing much faster than long distance calling in general.

Bell has been trying to build up its business from conference calls with a series of award-winning advertisements featuring howling wolves, singing whales, and warbling loons.

With Northern's equipment it is possible to link about 70 callers, although most business users would have fewer than 10 people at once.

The MS-1, which is known as a bridge, allows callers to restrict access to outside parties once a conference is in progress.

"Bell is currently reviewing its TeleForum rates with a view to possible reductions based on several components, including efficiencies gained from the MS-1 technology," said a spokesperson.

A Bell customer in Ontario would now spend \$6.16 per minute to have an operator link five callers in a transnational call, assuming two callers in Ontario or Quebec and three in other provinces.

Unitel Applies to Offer Long-Distance Service at Discount

55200046 Toronto *THE GLOBE AND MAIL*
17 May 90 pp B1, B4

[Article by Lawrence Surtees]

[Text] Ottawa—Unitel says it wants to compete for long-distance business in every part of Canada with rates 15 per cent lower than telephone company rates.

Although the long-awaited application filed with the federal telecommunications regulator yesterday is short on many details, Unitel is asking for permission to compete with the six largest federally regulated telephone companies in British Columbia, Ontario, Quebec and the four Atlantic provinces.

The company also declared its intention to compete against the three provincially owned Prairie telephone companies at a later date if Ottawa passes a new law to assume regulatory control over those companies.

The application is the second for Unitel, a Toronto-based telecommunications carrier known as CNCP Telecommunications until a name change last week.

Unitel is convinced it can succeed with this bid because of changes in its ownership and because "the mood of the world has changed," George Harvey, Unitel's president and chief executive, told reporters yesterday.

However, opponents of Unitel's application to the Canadian Radio-Television and Telecommunications Commission charged that the application is short on substance and fails to address the specific concerns that led to rejection of CNCP's first bid in August, 1985.

The CRTC rejected the earlier CNCP application on the grounds that it was not in the public interest because CNCP had failed to demonstrate that it would be viable, given the payments it would have had to make to the telephone companies.

Unitel also will have to pay the telephone companies to use their local networks, in addition to a compensation fee to make up some of the lost long-distance revenue that now subsidizes local telephone rates. Mr. Harvey said those amounts will be "a major portion of our revenue and will surprise even the phone companies."

However, Unitel did not state how much it will pay the telephone companies, nor did it provide any economic forecasts. Its business plan was also absent from the application and will be filed separately, in confidence, with the CRTC.

Unitel asked the CRTC to reduce its compensation payments to the telephone companies in the early years of Unitel's long-distance service because of what Unitel called "the inferior quality of interconnection" and its low initial market share.

Unitel's largest rival, Bell Canada, dismissed the application as "disappointing" and incomplete.

Bell's lawyers will ask the CRTC to require Unitel to file more details about its business plans and rate proposals, Bell president Jean Monty said in an interview following his company's press conference yesterday.

"I don't think we can comment fully on the application yet because there is not enough information in it," Mr. Monty said.

Bell contradicted Mr. Harvey's assertion that long-distance competition had not affected local telephone rates in the United States; Bell cited a U.S. government study showing local telephone rates had doubled since competition was introduced in 1978.

In entering the \$6-billion long-distance market, Unitel is proposing to phase its service in across the country over a six-year period. It expects to be able to provide access to its service to 57 per cent of domestic telephone subscribers by the first year, increasing to 88 per cent in the third year and to every telephone subscriber six years after receiving approval.

Unitel is also proposing to spend \$1.5-billion in the next five years to expand its national fibre-optic and microwave networks to support its service.

Bell argued that Canada cannot afford two separate long-distance networks and that consumers will ultimately pay for the duplication.

Mr. Monty assailed Unitel's request to the CRTC to allow it to get its long-distance rates 15 per cent below

the prices telephone companies are required to charge. Unitel wants the discount rates to attract customers.

Mr. Monty reaffirmed Bell's previous position that competition should "be on an equal and level playing field with the same rules applying to everybody."

But Mr. Harvey said the discount long-distance rates are needed to ensure that Unitel, owned by Toronto-based Rogers Communications Inc. and Montreal-based Canadian Pacific Ltd., can obtain market share. He argued that competition will not only benefit business, but lead to savings for 75 per cent of residential subscribers.

However, one provincial government official challenged that assertion. Douglas Smith, deputy minister of communications in Saskatchewan, said none of the three studies commissioned by various governments in the past four years supported Unitel's forecast. Mr. Smith said long-distance competition will erode existing companies' long-distance revenue, placing pressure on local rates.

"Our subscribers will be directly affected, even if Unitel does not compete against Saskatchewan Telecommunications," he said, adding that his government will oppose the application at the CRTC.

Although Mr. Monty said Bell will continue to reduce its long-distance rates as it cuts costs, he said it will be harder for Bell to avoid local rate increases as easily with long-distance competition.

Unitel dismissed these concerns, arguing that problems have been greatly exaggerated.

The Canadian Business Telecommunications Alliance—the largest group representing corporate users—supported Unitel's application.

"During the last 12 months, we have experienced what the threat of increased competition has done to the long-distance service rates," Brian Callihoo, president of the CBTA, said in a statement. "With real competition, we expect even greater rate reductions."

Mr. Harvey briefed federal Communications Minister Marcel Masse on the application at breakfast yesterday. Asked later about the meeting, Mr. Harvey said he briefed the minister "as a courtesy."

Industry observers said a decision on the application will take 15 to 18 months. No date has been set yet for public hearings.

Ten Companies To Test Pocket-Sized Wireless Telephones

55200048 Toronto *THE GLOBE AND MAIL*
in English 24 May 90 p B8

[Article by Lawrence Surtees]

[Text] Ten companies have won special licences to begin testing experimental cordless telephone systems that will

allow consumers to stay in touch virtually anywhere with pocket-sized telephones.

The new wireless system, called Personal Communications Services, will allow users to make calls from a portable handset within 100 metres of a public base station.

Similar European services introduced last year are called "Telepoint," which takes its name from the term for the base station that resembles a public telephone booth, but is capable of relaying calls from a subscriber to a myriad of wireless and non-wireless networks.

Personal communications services are being heralded as the next wave in telecommunications and of greater significance and economic potential than more costly cellular radio-telephone services developed in the 1980s.

The personal communications service trials, which will begin across Canada throughout the summer, involve most leading domestic telecommunications service providers and manufacturers.

The federal Department of Communications presented the licences to participants at a symposium in Toronto sponsored by the RadioComm Association of Canada and by the Radio Advisory Board of Canada.

Six service providers received trial licences: BCE Mobile Communications Inc. of Montreal, which currently provides cellular radio and paging services, will undertake trials in Toronto and Montreal; B.C. Mobile Ltd. will do a trial in Vancouver; Bell Canada will test Telepoint relays on Montreal, Ottawa and Toronto; Rogers Cantel Inc. of Toronto will experiment with services and relay stations in Toronto and Montreal; Telesat Mobile Inc. of Ottawa will test satellite links to the service; and Beeper People Inc. of Toronto will try out a variety of services in Toronto, Vancouver and Montreal.

Four manufacturers received licences to try out new equipment and services: Bell-Northern Research Ltd. of Ottawa, backed by Bell and Northern Telecom Ltd., is developing new technology for the systems that it will test in Ottawa; Glenayre Electronics Ltd. of Vancouver will test equipment in Vancouver, Toronto and Montreal; Novatel Communications Ltd. of Calgary will test a system in Calgary; and Motorola Canada Ltd. of Toronto has received a special licence so it can test new products it is developing.

The trials will end in September, 1991, following which the department will decide who can provide national services. Although there are still many technical and regulatory questions to resolve, the department is "contemplating four competing national networks," said Parke Davis, a director in DOC's telecommunications policy branch.

PCS phones and services will also be available for a fraction of the cost of the more expensive cellular telephone service.

But that does not worry George Fierheller, president of Rogers Cantel, Inc. of Toronto, who said PCS will complement cellular services and reduce the congestion caused by the scarce supply of radio frequencies for cellular service.

The new PCS cordless phones and cordless beeper phones currently cost between \$150 to \$300 (U.S.), which is as much as one-tenth the cost of cellular telephones. They will be available for less than \$100 as the market develops, according to Stuart Lipoff, director of advanced electronics technology at Arthur D. Little Inc. of Cambridge, Mass. Monthly service costs are also less.

The cordless phones are also of much better quality than portable phones typically used at home. In addition to being smaller, they also take advantage of new battery technology that gives them 40 hours of use between recharging.

Phone Service Identifying Callers Allowed Despite Protest

55200043 Toronto *THE GLOBE AND MAIL*
in English 10 May 90 pp A1, A2

[Article by Lawrence Surtees]

[Text] Bell Canada has received permission from its federal regulator to offer a call-screening service for residential and business customers—despite objections that it is an invasion of privacy.

Telephone numbers of incoming calls to subscribers with Bell's new Call Management Service will be identified by an electronic display on specially equipped telephones.

The service will make it inconvenient and expensive for telephone callers who wish to keep secret their phone numbers or identities.

Callers will only be able to block the identification of their numbers—including unlisted numbers—from subscribers using CMS by placing their calls through a local operator and paying a charge each time.

Bell plans to introduce the optional CMS in Ottawa, Quebec City and Hull, Que., later this year; in Montreal and Toronto next year; and in other locations in 1992.

Several organizations, including Quebec's human rights league, expressed concern that CMS users would be able to invade the privacy of subscribers with unlisted telephone numbers by identifying those numbers.

But in a 25-page decision released yesterday approving the CMS option, the Canadian Radio-Television and Telecommunications Commission ruled that CMS is in the public interest and will be profitable for the telephone company.

CRTC chairman Keith Spicer said the advantages of the service in reducing obscene calls and assisting emergency services outweigh the concerns.

However, the CRTC ordered Bell to provide a method of blocking to subscribers who want to prevent identification of their numbers by CMS customers.

"In reaching a decision, the commission has been mindful that the impact of CMS on the privacy of subscribers must be considered not only from the perspective of persons placing calls, but also from the perspective of persons receiving calls."

Privacy groups had wanted the CRTC to approve options that would have prevented CMS users from identifying any unlisted number.

Instead, The CRTC ruled that blocking for the caller should be provided by a local operator on a per-call basis with a charge for making an operator-assisted call.

Bell has been instructed to file its rates for the blocking service, as well as revised rates for the CMS option by June 26.

Subscribers will have no way of knowing who has the CMS service. Callers wanting to keep their phone numbers secret will have to go through an operator to place a call to any persons they do not know.

The commission rejected proposals that identification blocking be provided free of charge, arguing that a charge "is needed to ensure that callers suppress the display of their telephone numbers only when they feel they have a strong need for anonymity."

The CRTC stated that its solution "will not eliminate all potential difficulties associated with CMS." But it said it wants the benefits of CMS to be retained, siding with Bell's argument that automatic blocking of a number would mitigate the impact of CMS, allowing, for example, obscene callers to block transmission of their number.

THE CRTC listed six potential advantages for the service, including: a reduction in the number of annoying and obscene calls; increased assistance for emergency and distress-center operators when a caller cannot or will not identify a location; a reduction in false alarms and bomb threats; a potential reduction in frauds against business; and an ability for businesses to increase customer service.

Bell is the utility arm of Montreal-based BCE Inc. and serves 6.5 million subscribers in Ontario, Quebec and the Arctic. It began a market trial of CMS four years ago.

Bell has been instructed to provide customers with a billing insert detailing the services and to submit a report every six months to the CRTC on privacy complaints.

DENMARK

Greenland Radio to Constrict Home Rule Government Tie

90P20030A Copenhagen BERLINGSKE TIDENDE
in Danish 28 Apr 90 p 2

[Unattributed article: "Greenland Radio Becoming Independent"]

Text] [RITZAUS BUREAU] The Greenland Home Rule Government is planning to make Greenland Radio into an independent enterprise owned by the Home Rule Government. Presently it is an institution under the Home Rule Government's Cultural Affairs Ministry. It is intended that the broadcasting company will receive an annual operating appropriation, which the company will itself decide how to spend. The Greenland Radio board of directors will itself be able to hire its staff and make the necessary economic decisions. The new enterprise will also be permitted to broadcast commercials on radio and television in order to earn funds supplementing the operating appropriation received from the Home Rule Government. During the debate on Wednesday [25 April] in the Landsting [parliament] on the new structure, the representatives criticized Greenland Radio reporters. The Danish reporters on the radio news were singled out for special criticism. It was proposed that they be sent home and replaced by Greenlandic reporters.

FINLAND

Wireless Telepoint System Starts in Helsinki

90WT0084B Helsinki HELSINGIN SANOMAT
in Finnish 11 Apr 90 p 13

[Text] Based on radio communications and the lightest of portable telephones, the Telepoint commercial service is about to be initiated in Helsinki. The Helsinki Telephone Company (HPY) is backing the venture. The first wireless Telepoint calls outside of Finland can be made in the capital district.

During the initial phase, some 20 Telepoint relay stations will be in operation. They will cover the Helsinki downtown area, which extends from Kauppatori [old marketplace] to the Parliament Building via Erottaja and on to Finlandia House.

Telepoint is a radio system that makes use of the regular telephone network. Antenna-equipped relay stations transmit calls to the telephone network. The telephones are lightweight, portable digital phones that function as "wireless phone booths" in the Telepoint system. They can be used to make calls from within a radius of about 200 meters from a relay station, but they cannot be used to receive calls.

Tele-X Agreement Signed

90WT0084A Helsinki HELSINGIN SANOMAT
in Finnish 5 May 90 p 7

[Article: "New Agreement on Tele-X Cooperation"]

[Text] On Friday the president of the Republic approved an agreement between Finland and Sweden for the utilization of the Tele-X system. The agreement is to go into effect on 9 May.

According to the new agreement, Finland gets to use the system free of charge for putting a proportionate share—that is, three percent—of the Tele-X satellite's capacity into data and video services. Furthermore, Finland may purchase additional capacity on commercial terms. The agreement does not, however, cover the use of the television channels.

A company to be created for the purpose, which will operate in Finland as a partner of the Swedish party to the agreement, Sweden's Rymdbolaget [Space Company], will probably use the data and video capacity to be delivered to Finland.

Once the company is formed, the Trade and Industry Ministry will negotiate the terms with it for delivering capacity free of charge. The company has to donate part of its capacity for use by research institutes and colleges and universities.

"This way, the benefit will, as it were, be passed on to both industry and research institutes," chief auditor Per-Hakan Slotte of the Trade and Industry Ministry said.

In 1983, Finland and Sweden signed an agreement on industrial cooperation in developing the Tele-X system. In the now-to-be-terminated agreement there were no terms for the use of the satellite in Finland.

The Tele-X satellite was launched into orbit over a year ago. The owner of the system is Sweden's state-owned company, Nordiska Satellitaktiebolaget [Nordic Satellite Company]. The system is capable of transmitting television programs as well as data and video service.

In Finland the Nokia Company, the Valmet Company, the Teleste Company, and the State Technical Research Center participated in the construction of the Tele-X system.

Pocket Radio Phone System for Helsinki

90WT0083A Helsinki HUFVUDSTADSBLADET
in Swedish 20 Apr 90 p 6

[Text] Telepoint is the newest plaything for technology buffs. To put it briefly, it is a cordless telephone booth where people carry their own telephones in their pockets. They can make calls when they are within sight of one of the 20 telepoint kiosks located in Helsinki in the initial phase. The Helsinki Telephone Company (HTF) will start selling the telepoint phones in May.

The HTF executive director, Kurt Nordman, says the telephone company takes the idea of telephone service via radio seriously and intends to capture a substantial share of the market. Most of the market concerns NMT [Nokia Mobile Telephone] telephones and some other mobile systems along the same lines. It is estimated that there will be 20,000 new connections annually.

Telepoint is part of this trend. In discussing pocket phones Kurt Nordman says nothing about playthings, he talks about innovations.

"With pocket telephones we are supplying the market with a promising new radio service," he says.

The pocket phone HTF will start marketing is a CT-2 set that people can carry in their shirt pockets if they want to. It weighs only 130 grams and costs 1,850 markkas. The price is reasonable, but as we noted one has to be within sight of a telepoint that connects the call to the normal fixed telephone network. The ones that can be found now are located in the center of Helsinki in places where people move around, in Salutorget, near railway and bus stations, in department stores, hotels, and restaurants.

System Growing

It is anticipated that within a few years the system will have expanded to 200 telepoint stations in the capital region. At that point such locations as Helsinki-Vanda Airport will also be part in the picture.

This system is already found in England and will be introduced in other big European countries. However for a number of reasons Sweden, for example, will not be among them.

The cost of using the service in Helsinki will include an access charge of 50 markkas, a basic and normal call rate of 35 markkas a month plus 40 pennia per minute per call.

ITALY

Telecommunications System for Nuclear Physics Lab Described

90MI0180 Turin MEDIA DUEMILA in Italian Mar 90 pp 98-99

[Text] SIP (Italian State-Owned Telephone Company) has designed, coordinated, and developed the entire telecommunications system for the National Institute for Nuclear Physics (INFN) laboratory located beneath the Gran Sasso mountain. The laboratory was constructed by excavating 180,000 cubic meters of stone and creating three huge vaulted caves, 30 meters high by 100 meters long, approximately six km from the entrance to the l'Aquila highway tunnel. These caves are connected by an eight km network of galleries and lie beneath one and one-half km of rock.

The underground laboratory carries out research experiments on the neutrinos contained in cosmic radiation. It is supported by a high altitude laboratory located 2,126 meters above sea level at Campo Imperatore, and by an external laboratory located close to the entrance of the highway tunnel. This external laboratory operates as a data management, collection, and sorting center for the large amount of information that is obtained from the experiments, which must be transferred elsewhere in real time, often to major international research centers.

A researcher carrying out an experiment in one of the Gran Sasso caves can check on all the parameters either from his own laboratory, or from just outside the tunnel, or from Rome, the United States, the USSR, or any other city in the world. As the experiments currently underway involve Italian, as well as German, French, American, Soviet, Chinese, Japanese, Israeli, and Brazilian researchers, this has called for the development of a particularly advanced telecommunications structure at a cost of three billion lire.

SIP's structure consists of two basic systems. The first system is located between the internal and external laboratory and consists of a cable with 100 pairs of optical fibers and a second cable with 100 copper pairs. The second cable, produced with traditional technology, is used to disconnect experiments by remote control. Each of the two six-km cables is housed in a special container and runs through the highway tunnel. The system also includes an eight-km cable with 100 optical fibers (those normally in use have no more than 24 fibers), developed specifically for SIP by Pirelli. A cable with 100 pairs of optical fibers can carry up to 400,000 telephone conversations simultaneously.

The second system connects the external laboratory to the high altitude laboratory. It features a dedicated radio relay system that uses high-speed digital circuits. Two numerical PABX's, with voice/data integration and a two Mbit/sec. flow are connected to the optical fibers. By using a digital telephone, each operator can transmit his voice and data simultaneously through the telephone connection. Other carrier frequencies on the same cable (at 34 Mbit/sec) can also be used for the remote video control of experiments and the connection (at 10 Mbit/sec.) of the various local networks operating in different environments. A fourth connection level allows for high-speed interconnections (140 Mbit/sec.) between internal and external processors. SIP has also upgraded the transmission backbone that connects l'Aquila to Teramo, thus providing the INFN laboratory with a double connection to eliminate any danger of cutoff should one of the two lines break down. The connection to l'Aquila (with a traditional optical fiber cable) has been extended to Avezzano to interconnect with the international network through Telespazio's Fucino-based space center.

Italy, USSR Sign Telecommunications Accord

90MI0183 Milan NOTIZIE ITALTEL in Italian
Feb 90 p 11

[Article by Laura Sipala: "Lots of News on the Eastern Front"]

[Text] Italtel is starting to reap the fruits of contacts that were established years ago with the East Bloc countries. Its first agreements with the Soviet Union and Bulgaria are now in their final stages.

On 30 November 1989 Guiliano Graziosi and Salvatore Randi, managing directors of STET [Turin Telephone Finance Company] and Italtel, signed an agreement with Krasnaya Zarya, the principal Soviet telecommunications company. This agreement provides for the establishment of a joint venture for the supply of numerical switching exchanges. According to a preliminary estimate, production should total between 1.5 and 2.5 million subscriber lines per year.

The subscriber line should meet the USSR's need to develop its telecommunications system both on an industrial scale and in terms of service and performance. The Italian-Soviet joint venture will provide most of the lines required for this purpose. Other fields of cooperation as well as export opportunities are also being considered.

The monetary and financial aspects of the agreement are currently under study. The Soviet economy does not appear to have the monetary resources that are necessary for major investments at this time. Therefore, the launching of wide-ranging programs is undoubtedly linked to the USSR's methods of payment in hard currency. In addition, the agreement will have to conform to current regulations on the export of high technology products.

Italtel and Krasnaya Zarya are already working on adapting the subscriber line to the Soviet telephone network. A subscriber line exchange will be delivered in the near future for official approval.

From Europe to Japan

On 22 December 1989 another step forward was made at a meeting held in Milan between Vladimir Evsees, general manager of Krasnaya Zarya, and Salvatore Randi. At the meeting, the management boards of the two companies committed themselves to requesting the Soviet Electronics and Communication ministries to accelerate the final stages of the agreement.

Italtel has also taken part in a feasibility study in the Soviet Union on optical fiber telecommunications through the STET group, together with Western and Japanese managers and the Soviet Ministry of Communications. This system would connect West Europe with Japan by crossing the Soviet Union. Italtel is interested in supplying the optical fiber transmission devices and in defining the system. The project would involve three to

five years' work and a financial commitment of approximately half a billion dollars. The consortium is called Trans-Soviet Line Development Corporation (TSLDC) and includes STET, the American company U.S. West, KDD from Japan, British Telecom, OTC from Australia, the FRG Bundespost, the Danish company Great Northern Telegraph, Telecom Denmark, and the Soviet Ministry of Communications.

The First Exchanges

Last September STET presented its companies in Moscow with an exhibition of its products and services as well as a series of technical seminars. Programs involving Telespazio for satellite communications in case of natural disasters, and SEAT [Telephone Directory Publishing Company] for the transfer of editorial know-how in the field of telephone directories (there are currently no directories in the USSR) were also mentioned. Negotiations for the supply of a preliminary group of nine subscriber line exchanges for a total of 60,000 equivalent lines are also close to being concluded in Bulgaria, a country committed to modernizing its telecommunications network.

A memorandum of understanding was signed in Milan on 24 November by Salvatore Randi and Nikola Monov, general manager of Telecom, the Bulgarian institute that handles telecommunications negotiations abroad. This agreement provides for a close collaboration between Italtel and Bulgarian management institutes and companies for the development of joint industrial initiatives. The first international subscriber exchange will also be inaugurated in Albania at the end of March. Representatives from the Italian PTT [Post, Telegraph, and Telephone Office] will attend the ceremony.

SWEDEN

Ericsson Digital Switching Systems to USSR, CSFR

90P20039A Stockholm DAGENS NYHETER
in Swedish 31 May 90 p 22

[Text] Ericsson has now taken home an order from the Soviet Union. Ericsson is going to deliver digital business exchanges for two metallurgical plants in Makeyevka and Yenakiyev, both located in the Ukraine. It is estimated that the switching equipment will handle traffic on over 4,000 lines. Moreover, Ericsson has signed three contracts for digital business exchanges in the CSFR. The customers are metallurgical plants in the cities of Kosice, Viktvice, and Kempopetrol. The Czech order will handle some 22,000 lines.

UNITED KINGDOM

British Satellite Broadcasting Begins Operations

55500065 London *THE DAILY TELEGRAPH*
in English 26 Mar 90 p 27

[Text] British Satellite Broadcasting had its satellite communications debut last week with the first commercial broadcast of Datavision, its business communications subsidiary.

Along with five other companies which have been granted licences as "specialised satellite services operators," it can provide video-conferencing, financial data and point-of-sale promotional videos. One of the major uses is expected to be in-house distribution of video material—a procedure normally carried out by lugging piles of video cassettes around the country.

The market, estimated at 450 million in Europe by 1995, is lucrative. Datavision is aiming to bring in 5 million in its first year, doubling that every year for the next five.

With a standard television, it costs about 400 for each unit to receive and decode the satellite signal. Airtime costs 2,000 for 15 minutes at a peak time and 1,000 at night.

NatWest bank was the first to test its system. The first commercial user was Price Waterhouse, which transmitted a half-hour analysis of last week's Budget to seven of its offices in England and Wales.

Patrick Scott, Datavision's managing director, called it "a historic moment for telecommunications in Europe." Because BSB is providing equipment for consumers as well as businesses, Mr Scott said Datavision will be able to undercut competitors. But Datavision's receivers will not be available in bulk for several months.

The five other operators with a specialised satellite licence are British Aerospace, Electronic Data systems, Maxwell Satellite Communications, Satellite Information Systems and Uplink. The licence enables them to send video, audio and data from any point in Britain, via satellite, to a restricted group of users. The next step is to obtain permission for two-way links and transmission into Europe.

Independent, BBC Television To Own Stake in Transmitters

55500074 London *THE DAILY TELEGRAPH*
in English 9 May 90 p 7

[Article by Jane Thynne]

[Text] Independent television companies will be allowed a stake in owning their transmitters when the Independent Broadcasting Authority's system is privatised next year, the Government said yesterday.

But they will not be permitted to control the new company, as some ITV executives had argued was necessary as competition in broadcasting increased.

Holders of licences for both Channel Three (ITV) and Channel Five, will be limited to a 20 per cent holding in the company which will operate and maintain the 1,000 transmission sites co-owned with the BBC, said Mr David Mellor, the Broadcasting Minister.

British Telecom would also be banned from owning more than 20 per cent, because it has "a significant hold over the broadcasting communications market."

With the arrival of Channel Five and the creation of three national and hundreds of local radio stations, the transmission business in Britain is set for a rapid expansion.

But the BBC has been barred from competing for any of the new contracts.

The Government plans to privatise the BBC's transmission system in 1996, when the corporation's charter expires.

But Mr Mellor stressed yesterday that it would be banned from owning any of the new private transmission company so long as it owns transmission system remained in public hands.

Plans by ITV executives to explore investment in the new company were encouraged by the announcement.

There is no legislation to prevent the entire IBA transmission system being bought and operated by a non-British company. More than 40 companies from America, Japan and Europe have already informed Price Waterhouse, the firm handling the sale, of their interest in bidding for the new company—for a price of about £100 million.