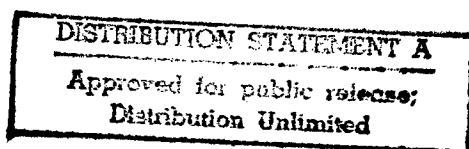




JPRS Report

Telecommunications



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Decision To Participate in U.S. Space Station Announced

Report on Announcement

55200036 Toronto *THE GLOBE AND MAIL* in English 22 Apr 88 p A3

[Article by John Kohut]

[Text] Canada has decided to take part in a U.S. led project for an international space station, even though the cost of participating has increased by nearly \$400-million from original estimates two years ago.

Science and Technology Minister Robert de Cotret and junior science minister Frank Oberle said Canada will spend \$1.2-billion over the next 15 years, giving it a 3 per cent stake in what they called "the most significant international space project of this century."

When Ottawa agreed in principle 1986 to join the space station project, it was estimated the Canadian contribution would be about \$800-million.

Yesterday's decision opens the way for Ottawa to set up a space agency, a long-promised initiative that Mr de Cotret recently had said would have to be scrapped unless Ottawa could reach final agreement on a space station role.

Mr de Cotret said that in return for investing in the station, Canada will get an estimated \$5-billion in commercial spin-offs and 80,000 person-years of employment over the next 15 years. He said the benefits will be spread across the country.

In addition, he said, Canada will gain access to important research and development and to technologies that can be developed only in space.

About 90 per cent of the Government's spending on the station will go to Canadian universities and industry, he added.

Canada's contribution to the space station is to be the mobile servicing system used in assembling and maintaining the station and in servicing and manipulating payloads, such as satellites and visiting spacecraft.

Mr Oberle described participation in the station as "a very important part of our over-all science and technology strategy."

Of the \$388-million in additional financing, roughly \$200-million will come from a \$1.3-billion, five-year science and technology initiative announced by Prime Minister Brian Mulroney in February. The rest will be new money taken from Government coffers after the fifth year of the program.

Canada's contribution to the program entitles it to send one astronaut to the station for six months every two years. The station itself will take 30 years to assemble in orbit, involving 20 space shuttle flights. Once completed, it will have a life span of 30 years.

The decision to participate in the space station "will allow us to move to the next stage, which is a space agency.... There's no question about that," Mr de Cotret said.

He refused to comment on when the agency will be announced or where it will be based.

Partners in the U.S. project include Japan and the 13-country European Space Agency.

Opposition critics said they supported a Canadian role in the station, but are not satisfied by the Government's statements on how the additional cost will be financed.

CITIZEN Comment

55200036 Ottawa *THE CITIZEN* in English 26 Apr 88 p A8

[Text] If any one thing finally convinced the federal cabinet to contribute \$1.2 billion to the U.S. space station project, it was probably the cost of saying no.

Some of Canada's scientists and astronauts were afraid that turning our back on this high-tech, highly-hyped experiment in manned space research would mean severing our ties with NASA and blighting Canadian research opportunities for decades.

The fears were probably exaggerated, as are projections of the jobs and commercial opportunities that will flow from the orbiting space station. Well-financed and world famous though it is, NASA isn't the only actor in space. Indeed, some European countries have sophisticated space programs that rely more on technological innovation than manned flight.

Even in the United States, many scientists have called NASA's obsession with putting people into space a public relations gimmick designed to make political not scientific gains. Some wonder if the station will have any commercial use at all; others believe its only client is likely to be military, despite assurances to the contrary.

On top of these uncertainties, the price of admission for Canada—\$1.2 billion over several years—is steep. Originally, the federal government was expected to contribute \$800 million. When that cost doubled, even cabinet had second thoughts.

Opposition MPs want to know how much of the new money will come from the \$1.3 billion that Prime Minister Brian Mulroney designated for academic scientific research, and the answers haven't been reassuring. It would make no sense at all to impoverish our already struggling research community for one glamorous, but doubtful venture.

Nor is there any guarantee that costs for the space station won't skyrocket again; indeed, it's almost a pattern with megaprojects.

For all that, Canada's contribution—a roving space robot capable of making repairs—may well have applications beyond the orbiting space station.

It also promises intellectual and economic opportunity for a generation of Canadian scientists. To begin with, our astronauts will have access to the station, performing six-month tours every two years.

Economically, it probably makes more sense to spend the \$1.2 billion on earth rather than routing it through space. Politically, it usually takes a splash of glamour to raise the money and public support for technological innovation.

Sometimes, it is braver to say "no" to opportunity. But sometimes it is wiser to give a qualified "yes."

07310

Partner Sought for Radarsat After British Withdrawal

55200037 Ottawa *THE OTTAWA CITIZEN* in English
22 Apr 88 p A3

[Text] Canada is looking for another partner in a \$725-million remote sensing satellite project because Britain has pulled out.

At a press conference Tuesday, junior Science Minister Frank Oberle said he had been notified by the British government that it decided to put its money into European space projects instead.

Called Radarsat, the 10-year project would result in a satellite system to gather information for commercial use on crops, forests, and other geographical features.

Canada was to develop the high-tech "guts" of the satellite—specifically the radar systems.

Britain was to build the basic satellite structure, while the U.S. was to provide a free launch for the earth observation satellite in 1994.

Radarsat will have a number of applications. From its orbit high above the earth, the radar will provide computerized images of earth structures.

The satellite will be particularly useful in protecting Canadian sovereignty in the Arctic.

07310

Satellite Monitoring Technology Sale to Mexico Reported

55200040 Ottawa *THE OTTAWA CITIZEN* in English
26 Apr 88 p B3

[Article by Wendy Smith]

[Text] Kanata's Miller Communications Systems Ltd. has marked its first month under new management with the sale of satellite monitoring technology to the Mexican government.

The systems engineering company, sold two weeks ago by president and founder Allan Miller, is now in the hands of a holding company 70 per cent owned by Calian Technology Ltd., of Ottawa.

Three former Miller employees hold the other 30 per cent.

The system purchased by Mexico will measure a number of characteristics of signals transmitted via satellite, and alert the operators if a signal is not travelling properly, said John Bodie, manager of monitoring systems.

The deal is worth about \$100,000.

This is the ninth system to be marketed, said Bodie, one of three key employees buying into the company.

Similar installations are in place in China, Israel and the United States he said.

The once-prosperous company, sold by Miller because of illness, has been in the red for at least two years, and has seen its staff drop from 60 to 15 said Calian Technology president Larry O'Brien who worked for Miller in 1975 and 1976.

"The only thing they're lacking is a cohesive marketing program," O'Brien said.

"We're certainly planning on expanding our marketing efforts, and we will be hiring additional staff, both technical and marketing, over the next six months."

Calian Technology, a technical service firm with 65 employees, has set up quality assurance systems for Miller Communications since 1984.

Both firms will continue to operate independently, at least for the next couple of years, but will share such resources as accounting, marketing and facilities, he said.

Calian Technology's sales have grown rapidly since the company was founded in 1982, O'Brien said. Sales in 1982-83 totalled \$102,000. By 1985-86 sales were \$1.8 million.

07310

Microtel Announces Dropping of VSAT Development Plans

55200039 Vancouver *THE SUN in English*
20 Apr 88 p E1

[Article by David Smith]

[Text] Microtel Ltd. has scrapped plans to market a satellite communications system after receiving a \$1.1-million federal contract last year to help develop a prototype of the system.

Bruce Spence, Microtel director of corporate communications, said with mounting research costs and a missed production date, it was decided the cost of commercializing the Microtel VSAT (Very Small Aperture Terminal) was too high.

"We had a problem with the product," Spence said. "The costs of research and development got to the point where they were too high to bring it on the market."

Microtel is a Vancouver-based B.C. Tel subsidiary. The decision not to proceed with the project was made by the B.C. Tel board, Spence said.

"It was a sad situation for us," he said, "It's one thing to build a prototype and it's another thing to commercialize it. The B.C. Tel board didn't want to give us the money."

VSAT provides low-cost, inter-active data and video transmission service, using a software-driven satellite system.

Funding for the prototype was co-sponsored by supply and services and the department of communications under the federal unsolicited proposal program. Michel Lucas, DoC media relations officer, said Tuesday from Ottawa that money was made available to Microtel because, "we thought it was important research."

Microtel had a federal contract to deliver a working prototype of the VSAT technology to the government and it did that, Lucas said.

"We ordered a prototype and we got it. If Microtel decides for business reasons it's not going to work in the marketplace, that's their decision," he added.

Communications Minister Flora MacDonald and then-Supply and Services Minister Monique Vezina announced the completion of the federal-Microtel contract May 20.

Microtel had planned to sell its first VSAT to Montreal-based Canadian Satellite Communications Inc. (Cancom), a major satellite network supplier. Cancom also announced May 20 that the first commercial use of VSAT technology in Canada "will begin in January 1988."

Cancom vice-president Thomas Moorehead said Tuesday from Toronto, "we had to look around fairly quickly to find another system."

Cancom eventually obtained a VSAT system in the U.S. after "scrambling" around, Moorehead said. "We were quite disappointed we couldn't find a Canadian supplier."

07310

Ontario To Equip Air Ambulance Fleet With Satellite System

55200038 Toronto *THE GLOBE AND MAIL*
inEnglish16 Apr 88 p A7

[Text] The Ontario Government is to equip its air ambulance fleet with satellite communications systems.

The \$1-million project announced yesterday is designed to permit more extensive life-support services for residents in northern Ontario.

The federal and provincial governments made the joint announcement after the technology, which uses Canadian-made communication equipment, was tested on a small Cessna Citation jet.

The system will allow paramedics flying in latitudes above 50 degrees North to remain in contact with doctors at one of 14 hospitals in southern Ontario.

Each air ambulance will be equipped with a special satellite communications antenna mounted in a window of the aircraft.

The air ambulance service will communicate with an Inmarsat satellite, which is owned by a consortium of 56 nations to provide satellite services to ships.

The paramedics will communicate to the ground via the Inmarsat satellite, which will then relay the signal to an Ontario Ministry of Health Centre. That Centre would relay the information to one of the hospital base stations.

07310

**Light-Triggered Fiber-Optics Switching Element
Developed**

55200041 Vancouver *THE SUN in English*
6 Apr 88 p A7

[Text] Halifax—A professor at the Technical University
of Nova Scotia says he's developed a major breakthrough

in fibre-optics technology. Michael Cada said Tuesday
his research team has developed the first fiber-optics
switching element to be triggered by light. The device is
intended to replace electronic switches used in current
fibre-optics technology.

07310

HONG KONG

Government Imposes Fees on Commercial TV Stations

55400047c Hong Kong HONGKONG STANDARD
in English 30 Mar 88 p 1

[Article by Tonny Chan]

[Text] The Executive Council yesterday ruled that commercial television stations should pay royalties for using the air waves—irrespective of whether they made profits.

The measure is expected to put almost \$10 million more into the public purse each year from Asia Television Ltd (ATV) and Television Broadcasts Ltd (TVB).

Exco also gave the Broadcasting Authority the power to penalise TV stations for breaking the television code of practice, which outlines the amount of violence or sex that should be allowed in programmes.

"The conditions are not too stringent when compared to other countries," deputy secretary for Administrative Services and Information Miss Elaine Chung said.

At present, ATV and TVB are required to pay the Government 25 percent of their net incomes in return for their licences. But ATV has not paid its share for several years because it has been running in the red.

The licences of both stations are due to expire at the end of this year and the Government has said it will renew the franchises for another 12 years, up to the year 2000.

"(The Government) considered use of the air waves as a privilege, irrespective of how the stations perform...air waves are one kind of public resource," Miss Chung said.

Based on current performances, and taking 1986 as an example, Miss Chung said ATV would be expected to pay \$4 million in 1989 rather than nothing and TVB would be expected to cough up \$85 million instead of the \$80 million it paid in 1986.

She said the current 25 percent formula would be replaced by a rate system of tax on the gross income from advertising and selling of programme rights to other companies.

The kick off point will be \$100 million, on which one percent tax will be due. The liability will rise to 5 percent for the second \$100 million, and each subsequent \$100 million attracting a further 5 percent.

Relief will come in overall royalty payments which will be subject to a maximum of 10 percent of the total gross income from advertising and selling of programme rights. Any other income will not be taxed.

The two television stations yesterday avoided immediate comment on the sweeping measures. Their spokesmen said they needed time to study the decisions.

The changes, planned to be tabled in the Legislative Council before July, include:

- * Empowering the Broadcasting Authority to suspend the stations' licences for a maximum of one month, which is not provided for in the current Television Ordinance.

- * Cutting from 18 months to 60 days the amount of notice to be given to a station after the Governor-in-Council has revoked its licence.

- * Extending the ban on liquor commercials from 4 pm to 8:30 pm and the ban on tobacco ads from 4 pm to 10:30 pm.

/9604

Description of First Fully Digital Satellite Service

55400047a Hong Kong HONGKONG STANDARD
(Telecommunications Special) in English 14 Apr 88 p 6

[Text] The territory's first totally digital integrated service—the High Speed Digital Service (HSDS)—is providing a fast, low-cost satellite communication link between Hongkong and several major corporate centres.

The launch of wideband HSDS by Cable and Wireless (HK) Ltd has given local institutions a state-of-the-art answer to their needs for voice, data and facsimile communication as well as video conferencing at the international level.

According to John Swiney, Divisional Manager in charge of private networks at Cable and Wireless, circuits would be leased on both a part-time and a full-time basis with special provisions for occasional use.

HSDS has brought Hongkong a step closer to the realisation of Cable and Wireless' goal of a global digital highway, directly linking the territory with North America and Europe.

It will further strengthen Hongkong's position as the leading trading and financial centre in the region. HSDS provides a full range of business service applications, while retaining the flexibility for the customer to make technical and service improvements as they are identified.

Since HSDS is a totally digital service, Mr Swiney said, large or small volumes of information could be transmitted quickly and with few errors. He said the techniques were similar to those used to provide the superior sound quality available from digital compact disc players.

This high reliability has made HSDS a trusted communication tool. In Hongkong, several companies have leased full-time HSDS circuits and many more have indicated an interest in setting up their own digital networks or point-to-point trunk circuits for an integrated voice, video and data service.

Mr Swiney pointed out that HSDS had great communication value to both financial and multinational organisations based in Hongkong.

"The vastly reduced cost per 'bit' of information has allowed our customers to provide sophisticated computer information facilities to their overseas offices at reasonable cost.

"This increases their efficiency without any significant cost penalty," he said.

Mr Swiney said the service was initially restricted to the United States, with plans for expansion to Europe and the Asia-Pacific region. Several countries in this region—including Japan, Korea, Singapore and Australia—were already completing installation of the service. HSDS was being offered to Hongkong subscribers at low rates to build a substantial subscriber base.

Mr Swiney added that multiple, digitised voice circuits could be carried on a single HSDS circuit.

HSDS also enables users to provide their own data communication networks, host-to-host and PC-to-computer communications, private packet switching networks, world processing, document transfer systems, remote terminal access to a company's mainframe and electronic mail networks.

This is in addition to video conferencing and dedicated facsimile networks. The ability of the service to combine multiple applications through digital multiplexing techniques also eliminates the need for several circuits for each separate application.

/9604

Computer-Data Protection Laws Pose Thorny Issues

55400047b Hong Kong HONGKONG STANDARD (Infotech) in English 24 Mar 88 p 1

[Text] Data protection, as set out in Government guidelines released last week, won't necessarily mean you won't be used for someone else's commercial purposes.

"Who is to say you are the owner of your own name?" Mr A F M Conway, a member of the Government's original working group on data protection, said yesterday.

That question had yet to be proven, he said.

The remark underlined the complexity of drawing up rules on a subject that Mr Conway has battled for 17 years. Part of the process, he said, involved educating legal professionals on what had grown into a very difficult subject for laymen.

When releasing the 12-page document, Secretary for Administrative and Information Services Peter Tsao put the Government's concern this way: "There is a need to strike the right balance between those who make use of personal information in their everyday business, those who are the subject of the information and the community at large."

Three items on the scale: another indication that the legislative process will likely be a difficult one.

The guidelines—which the Government conceded at the outset are general—set out the framework for collecting information on individuals and provisions for holding onto it.

The just-released page booklet says organisations should tell target individuals why they are collecting the information and limit its use to "the fulfilment of legitimate purposes already specified or such others as are not incompatible with them."

Information should be relevant, held for only as long as needed, not distributed without consent of the subject unless with permission or the intervention of law. The booklet also outlined procedures for overseeing documents in organisations.

On the list question, Mr Conway, who is chairman of Hongkong's Information Technology Federation, suggested that people who joined organisations like American Express were joining a club. "And that comes with privileges." People expected their names to be used.

The Government's working group was set up in 1983 and first comprised only civil servants. The next year, five members of the general public, all of them with interests in technology, were invited to join the group.

Mr Conway said it was important to have guidelines in place quickly. Setting procedures into law would be too lengthy a procedure when the general view was that some form of data protection provisions should be in place as soon as possible.

There is concern that the outside world, particularly OECD-member countries—which have settled on a data protection convention—view Hongkong as a place where data protection is respected.

But Mr Conway said that it was important to take the legislative road carefully so that the territory ends up with effective laws. He said the UK had developed especially cumbersome data protection legislation that involved a complicated registration procedure that took

in everything from the sensible to the ridiculous. Housewives holding party lists on memory devices, he said citing an example, had to be registered.

"In Hongkong, we don't have laws waiting for crime to happen," he said. "We write laws when we decide we won't put up with something."

Mr Conway said that, without a large legal machine, Hongkong tended to hive off appropriate UK legislation as new laws were required.

But as the Government has indicated, a new working group will be convened to look at a broader range of legal approaches to the issue.

/9604

Optical Fibres To Replace Telephone Cables
55400048 Hong Kong HONGKONG STANDARD in English 7 May 88 p 5

[Text] The Hongkong Telephone Company plans to replace traditional cables in residential blocks with advanced optical fibres to provide domestic subscribers with fast, high-capacity telecommunications services by the next decade.

It has not set a "target year" but it intends to implement the change by the mid-1990s.

This was revealed yesterday by Mr John York-Williams, the company's General Manager for Corporate Affairs.

At present only 38 commercial buildings and hotels which require high-capacity telecommunications, are served by the optical fibres system.

High capacity telecommunications include facsimile machines, international telephone calls and conferences as well as data transmissions.

Mr York Williams said his company's plan would be affected by developments in other parts of the world and by the Government's decision on the setting up of a new cable television network here.

He said the high price of an optical fibre system had so far prevented it from being used in many applications.

He said experiments were being conducted in the United States to score a breakthrough on the better use of optical fibres.

Mr York Williams said his company would follow the United States and Japan, where there was a huge market for telecommunications services, if they decided to use fibre optics on a large scale.

Mass production would eventually bring prices down to an affordable level, he said.

08309

Telecommunications Now, in Future Examined; Changes Loom

Government Policy Statement

55400046 Hong Kong HONGKONG STANDARD in English 20 Apr 88 p 3

[Text] In a "surprise" statement yesterday the Government repeated its claim that it had no pre-conceived views about the future of telecommunications in Hongkong.

The statement came after a month of speculative reports concerning a Government consultancy report on the highly sensitive issue.

The Government had remained tight-lipped until yesterday when it came out with the statement and said it had not yet formulated its view on future policy.

Consultants Booz, Allen and Hamilton were commissioned by the Government to do a study on the need for any major changes in the telecommunications industry in Hongkong.

The study cost the Government more than \$2 million.

A report in THE STANDARD last week revealed that the cost to subscribers could go down by 15 percent if telecommunications services were opened up to competition in 1995.

In dollar terms this would mean a saving of at least \$7 billion over 12 years.

But other reports claimed that if the field were opened up to competition, Hongkong Telephone Company might be forced to raise its charges for local calls.

The reports also raised the possibility of disruptions if a second telecommunications network was approved.

The Government said it was still studying the proposals put forward by Hongkong Telecommunications Ltd and Hutchison Cablevision Ltd, a subsidiary of Hutchison Telecommunications Ltd.

The two companies have expressed an interest in building and operating a cable television service in the territory.

Threat to Monopoly

55400046 Hong Kong HONGKONG STANDARD in English 24 Apr 88 p 5

[Article by Jessie Yim and Winnie Fu]

[Text] Hongkong's future as an information hub of southeast Asia is about to reach a crossroads.

In about 2 months, the Executive Council will meet to decide whether to cut the monopoly on telecommunications—a move that could loosen the boundaries on everything from long distance phone calls to telex services.

And with a decision expected soon on choosing a cable television service for the territory, whoever wires up the flats and homes of Hongkong could eventually provide services such as home banking and shopping—literally reshaping Hongkong's culture.

Behind the decisions lie the fortunes of two large Hongkong companies, Hongkong Telecommunications and Hutchison Telecommunications.

The Government is going to have to decide whether to continue the monopoly of Hongkong Telecommunications, or let Hutchison Telecommunications start a second rival network.

In a decision that would end months of sometimes acrimonious debate, the Government will have to assess the risks, and rewards, of a second telecommunications network.

It is a fight that has already gone beyond the inner workings of Government and into the media, with the aim of swaying public opinion.

There is strong talk about freer competition from upstart Hutchison Telecommunications. It is talk reminiscent of the historic breakup of giant American Telephone and Telegraph (ATT) in the early 1980s.

The decision to pull apart the huge American corporation has long been weighed as a model of industry deregulation around the world, a move that has made its mark in Hongkong.

At that time telecommunications was a remote subject to many in Hongkong. But the issue came to the fore here when the building of a cable television system for the territory suddenly prompted a look at the entire industry.

A new study into the industry and its shift ahead into the 21st Century was commissioned by the Post Office Master General.

The recently completed study remains under wraps, but THE SUNDAY STANDARD has learned that it favours some deregulation of telecommunications.

In an interview with THE SUNDAY STANDARD, Mr Richard Siemens, Hutchison Telecom's group managing director, made it clear his company felt it was time to share the market for business such as international calls, telex or data transmissions.

He argued that there was no point in keeping the monopolistic scenario if the market could support two rival networks.

In contrast, the head of Hongkong Telecom's telecommunication group, Mr Michael Gale, insisted that ultimately customers would have to pay more.

If one company reacted to competition by reducing the charges, it would inevitably put up the prices of another service to "maintain overall profitability," he said.

Behind the battle for public opinion lies the trade figures for a burgeoning industry.

Total turnover generated by international telecommunications services has grown by a compound average rate of 34 percent, reaching \$3.1 billion last year.

And that if competition were allowed, the total market is estimated to grow by 300 percent in 20 years, according to the statistics in the new Government study.

Formed just 2 years ago, Hutchison Telecom already has six subsidiaries, posing a great threat to UK Telecom.

Hutchison Telecom is wholly owned by Hutchison Whampoa, a major concern of business-tycoon Mr Li Ka-shing.

HK Telecom is still the "big-brother" of the business, holding Cable & Wireless (HK) which has a monopoly on international telecommunication services up until the year 2006.

It also holds Hongkong Telephone, which has the monopoly to give basic telephone services until 1995.

The company is making a great effort to preserve the status quo.

And there was strong exchange of words between the two parties when Hutchison came in.

The nearly \$3 million report by Booz, Allen and Hamilton, completed last month, has been regarded as highly sensitive, but with parts of it already leaked to the media, both sides have been using some of it to promote their own cause.

For Hutchison, one powerful bargaining chip is the possible benefits to end-users offered by more choice. This point, however, was immediately termed short-sighted by HK Telecom.

Hongkong Telecom's Mr Gale rejected the notion that there would be any great amount in savings on telecommunications services.

He said the experience overseas showed that "an overall reduction of 5 percent in telecommunication charges was the most that had been achieved in the short term."

He added the infrastructure for international telecommunications needed vast investment. "What is the sense of duplicating all those facilities and capital expenditure."

But the new report, outlined to SUNDAY STANDARD, concluded that if competition was introduced in 1995, customers would be able to cut their costs by 15 percent on international telecommunications services.

In money terms, it would mean a saving of at least \$6.9 billion at today's price.

Status of Technology

55400046 Hong Kong HONGKONG STANDARD in English 24 Apr 88 p 5

[Text] Only the figures can show the extent to which telecommunications technology has progressed in Hongkong.

There are, in the territory, 27,000 telexes, 40,000 facsimile machines and 2.5 million telephones. Every person in Hongkong makes an average of nine international direct dialling phone calls overseas annually and more than 1,000 hours of satellite transmissions arrive here each year.

But "telecommunications" itself covers a vast area. Broadly speaking, any equipment that assists in producing, transmitting, storing, receiving or displaying information can be classified as telecommunications technology.

This includes concepts such as videotext, teleconferencing, videodiscs, high definition TV, cable TV and even direct broadcasting satellites.

Already the private sector is pressing the Government to consider deregulating international communications to allow for free competition in this area.

Hutchison Telecom is actively bidding for rights to launch hi-tech projects like the setting up of international databases and cable television. It has even succeeded in launching a regional satellite venture.

Given the extremely profitable telecommunications business in Hongkong, it is not surprising that the monopolies of Hongkong Telephone and Cable and Wireless have been challenged.

The market has grown at an annual rate of over 40 percent during the past 5 years. Hongkong is not only a communications hub, it is an obvious gateway to China's grossly underdeveloped telecommunications infrastructure.

Hongkong Telephone (Telco), incorporated in 1925, has long monopolised telephone services in the territory.

Telco's franchise was renewed on 1 July 1975, giving it the right to operate the public telephone service till 1995.

International telecommunication services are provided under an exclusive licence granted to Cable and Wireless (HK) which is valid till the year 2006.

C & W provides an international network for long distance calls. This includes IDD and basic information provisions such as phone-mail, facsimile, telex, office automation and public data services.

Paging services are operated under a free market while the mobile phone service is currently run by Communication Services Limited (CSL), under Cable and Wireless, Hutchison Telecom and Chinatel.

Hutchison is aiming at what it calls value-added services.

Hutchison Cable Vision, aiming for the cable TV franchise, is making an offer of \$100-a-month subscriptions to households. It projects that half of the territory's 1.5 million families will switch to their service.

Hutchison's confidence in the Asian market's potential is well founded.

Out of the top 20 telecom organisations in the world, only one is Asia based—NTT of Japan.

"Considering the Asian population of 2.5 billion, which is five times that of the countries served by those organisations, it is not difficult to see the...vast potential of the Asia market," said the group marketing director of Hutchison Telecom, Mr Federick Sum.

Consultants' Report

55400046 Hong Kong SOUTH CHINA MORNING POST in English 27 Apr 88 p 23

[Article by Lulu Yu]

[Excerpts] Hongkong is in a unique position to benefit from having a competitive network of telephone services in the long run, according to Mr Charles Jonscher, a British consultant responsible for the Government-commissioned report on the future of telecommunications in the territory.

He is a British partner with Booz, Allen, and Hamilton (BAH), one of the world's largest management consultancy firms whose clients include Government agencies and international financial corporations.

The BAH report, which took 6 months to complete, says phone charges will be lowered by 10 to 15 percent if a competitor is allowed to provide an alternate network for international phone calls and other data communication services.

The economic benefits in terms of lower costs and charges would amount to some \$5 billion in the next decade if the Hongkong Telephone Company's franchise for local and overseas phone calls were not renewed in 1995.

The benefits, however, would be much lower if the franchise was amended in such a way that only Telco's monopoly on domestic services was broken up.

Telco's potential rival is joint venture company Hutchison Cable Vision (HCV), which is also the major contender for Hongkong's cable TV licence.

Mr Jonscher yesterday refused to comment directly on the findings of the report, but confirmed that consultants were of the view that telecommunications and cable TV should be treated as two separate issues in the territory.

He said it was found that whoever won the bid to operate cable TV in Hongkong would not need to branch out into other telecommunications services in order to run a viable business.

This was because the construction of an underground network formed only a small part of the \$2.5 billion investment in cable TV, so that whether or not the network was also used for other purposes did not stand up as a crucial factor of consideration.

The Government is set to make recommendations on whether to deregulate Hongkong's telecom industry by the end of next month, to be followed by formal tendering of cable TV later in the year.

The options laid down by the consultants range from retaining the existing monopoly situation to a complete deregulation of the industry, allowing competition for all the services currently provided by Telco and Cable and Wireless.

When the Executive Council makes its decision around the middle of the year, it is expected to take into consideration political factors and the long-term interest of the territory.

Any decision to amend or take away Cable and Wireless' franchise, which expires in 2006, will have to be implemented by the post-1997 government, which might form other views on the matter of deregulation.

A senior official confirmed yesterday there were legal constraints to allowing competition for external communications services before the franchise of Cable and Wireless expires in 2006.

Despite advantages to deregulating the industry the Government would find it difficult to justify an amendment of the 25-year franchise.

The official also said the report by BAS [sic] would never be made public because it contained sensitive information.

/9604

POLAND

Development of Polish Telecommunications Through 1990 Profiled

26020011a Warsaw PRZEGLAD
TELEKOMUNIKACYJNY in Polish
Oct-Nov 1987 pp 291-294

[Article by Andrzej Zielinski, director, Central Research and Development Program No 8.5: "Main Directions of Science and Technology Progress in the Domain of Telecommunications Under the Plan for Implementing CPBR [Central Research and Development Program] No 8.5 During the 1986-1990 Period"]

[Text] A basic condition for restructuring and modernizing the national economy is the spread of electronics. This is reflected in Resolution No 77/83 of 27 June 1983 of the Council of Ministers Concerning the Electronization of the National Economy Through 1990, in the Decision No 57/84 of 5 November 1984 of the Government Presidium to assure the implementation of the above resolution, and in other documents relating to programming the development of the national economy and of international economic cooperation within CEMA for the period until the year 2000.

The basic directions of the spread of electronics throughout the national economy include telecommunications. The needed acceleration of growth of telecommunications until and after the year 2000 can be achieved owing to science and technology progress, i.e., owing to the:

- new production and operation of modern equipment and systems;
- introduction of new kinds of services;
- application of new technologies in industry and communications;
- application of new techniques for the maintenance of equipment and networks.

In addition, a longrange goal in developing telecommunications is the technical and subsequently service-oriented integration of the telecommunications network. A way of achieving this is the intensive introduction of digital equipment and systems into networks as of 1990. In this connection, it is necessary to create a basis for the accelerated quantitative and qualitative expansion of the telecommunications services provided by the ministry of communications, to be insofar as possible based on digital telecommunications systems.

Special priority should be given to the telephone system, it being the most common form of telecommunications services throughout the world and in Poland. In Poland this system is technically obsolete and quantitatively backward. This is reflected in telephone density, i.e., the number of telephones per 100 capita in this country—which is accepted worldwide as the indicator of the quantitative development of telecommunications. In Poland in 1982 this indicator amounted to 10.02 telephones per 100 capita, compared with the worldwidindicator of 12.7 telephones per 100 capita and, in, say, e

Sweden, 86.4 telephones per 100 capita or in Czechoslovakia, 20.4 per 100 capita. In this respect Poland is ranked close to the bottom in Europe.

Other domains of telecommunications in Poland, too, are backward quantitatively and qualitatively, e.g., radar, data transmission, etc.

The digitalization of telecommunications systems in Poland is chiefly linked to:

- development of time-dependent commutation systems;
- development of digital transmission systems;
- development of fiber-optics and radio systems;
- development of computerized information services;
- technical integration of telecommunications systems;
- use of up-to-date control and measuring devices and systems assuring the automation of the control, guidance, and operation of the telecommunications network;
- broad introduction of electronic integrated circuits with a high degree of integration and microprocessors into telecommunications;
- automation and roboticization of the manufacture of telecommunications equipment.

The broad introduction into telecommunications of new technologies based on recent achievements of microelectronics should assure:

- augmenting the multiplexing of teletransmission systems and the capacity of switching equipment;
- greater flexibility of systems and equipment owing to the possibility of altering their operating programs;
- introduction of new kinds of services;
- augmenting the durability and reliability of equipment;
- reducing the energy-intensiveness of technological equipment and processes;
- miniaturization of equipment and hence also reduction in the surface area of the premises housing telecommunications equipment;
- reducing demand for scarce materials such as steel, copper, lead, cement, etc.;
- reducing the numbers of the personnel needed to staff operations, construction, and industry.

Research Programs

The principal research, development, and application tasks in the domain of telecommunications for the 1986-1990 period are comprised within:

- Central Research and Development Program No 8.5, in the Chapter on Telecommunications;
- Nine government orders relating to the development of science and technology;
- 12 ministerial R&D programs;
- Central Basic Research Program No 02.16, in the Chapter on the Development of Data Transmission Technologies.

Central Research and Development Program No 8.5, which represents the core of research problems in telecommunications, handled mainly by the Institute of

Communications, is divided into subprograms which in their turn are divided into targets to be accomplished. The structure of this program is formed by the following subprograms:

- digital telephony and telephones;
- digital teletransmission and fiber-optics electronics ;
- radio communication, the spread of radio broadcasting, and digital television;
- telegraphy, computerized information services, and tele-automatics;
- technology of electronic systems for the needs of telecommunications;
- automation of systems control and maintenance within the telecommunications network;
- basic R&D work on digital networks.

The targets specified in the subprograms, are divided into:

- application targets, postulating the practical application of research results prior to 1990;
- preemptive targets, postulating the practical application of research results after 1990;
- cognitive targets.

Research under CPBR [Central Research and Development Program] Telecommunications has been under way since 1986. Some of the results achieved in 1986 are presented in the articles collected in this issue of PRZEGŁAD TELEKOMUNIKACYJNY.

Below are described the implementation target groups pertaining to discrete subprograms.

Digital Telephony and Telephones

This subprogram comprises:

- electronic commutation systems;
- electronic telephones.

Research topics pertaining to commutation relate to broadening the possibilities for producing the E-10 digital switching system under a license. It is expected that more modern electronic components will be incorporated at subscriber level, in central control groups and at central operating stations, and in addition that CCITT-recommended higher-order programming languages will be introduced. It should be emphasized, however, that the principal direction in which E-10 is to be improved has already been determined by the corresponding government order. Plans exist for developing an integrated digital link system for verbal information transmission with the object of introducing modern equipment for the operation and control of telephone networks and exchanges. In addition, local small-capacity (100-300 NN) exchanges with a digital commutation field and microprocessor control are to be developed for rural areas, along with digital communications terminals on subscriber lines, with the object of enhancing the use of subscriber networks, chiefly in areas with low telephone densities per 100 capita.

As for cognitive research, studies of selected longrange aspects of integrated networks are envisaged, chiefly with respect to the possibility of introducing the E-10 system and a standard switching system adapted to these networks within the framework of CEMA.

Other topics in this subprogram pertain to the development of a family of public electronic telephones and the introduction of pay telephones that accept credit cards as well as of telephones for persons with impaired hearing. Also envisaged is cognitive research into modern techniques of measuring the quality of telephone transmission and into a multipurpose subscriber network.

Digital Teletransmission and Fiber-Optics Electronics

This subprogram comprises:

- digital systems for signal multiplexing (120-fold, 480-fold, 1,290-fold, and 7,680-fold);
- digital lines along metal and fiber-optics tracks;
- testing, control, and service equipment;
- optoelectronic transmission and reception equipment for systems with capacities of 2, 8, 34, and 140 Mbits/s;
- optoelectronic passive elements.

The development of highly multiplexed digital teletransmission will make possible an improved utilization of existing and newly installed copper and fiber-optics cable lines, which should in its turn serve to activate a greater number of telephone connections. Also expected is the development of equipment serving to link digital to analog networks (conversion terminals). The introduction of fiber-optics lines yields a number of advantages, including considerable savings of copper in the telecommunications networks and enhancement of the reach and multiplexing capacity of teletransmission systems as well as a marked reduction in the number of regenerators. As known, this concerns chiefly digital systems.

Work to develop new measuring devices is envisaged, chiefly those suited for operational needs, along with the development of optoelectronic passive elements (junctions, switches, couplings, etc.) minimizing losses in optic fibers. Other research under this subprogram concerns enhancing the reliability and operating certainty of teletransmission systems and augmenting the resistance of equipment to outside noise. Broad cooperation under CEMA is envisaged, especially as regards the development of a fiber-optics line with a capacity of 140 Mbits/s.

Radio Communications, Radio Broadcasting, and Digital Television

This subprogram comprises:

- automated land-based mobile radio communication systems;
- digital radio broadcasts;
- digital and cable television;
- satellite radio broadcasting systems (based on digital engineering).

The principal purpose of the development of automated land-based radio communication systems is to create general-purpose radio-telephone networks for streamlining the administration of the state and the national economy. This purpose will be accomplished through cooperation within the CEMA framework.

The purposes of the development of digital radio broadcasting, digital television, and cable television are to be both the initiation of the production of equipment for the encodement and digital transmission of radio and television broadcasts and the introduction of a new service that would enable subscribers to receive not only several television channels but also various additional information such as teletext, video telephony, etc. This will make it possible to improve the techniques for the transmission of television signals, streamline the utilization of the frequency spectrum, and provide subscribers with new kinds of information. This will contribute to laying the foundations for implementing an integrated digital transmission network providing various services.

The development and introduction in this country of a system of satellite radio broadcasting in the 12 gigahertz range will make it possible to broadcast five television channels received with the aid of equipment adapted to WAIZ large collective-reception antenna installations.

Telegraphy, Computerized Information Services, and Remote Automation

This subprogram comprises:

- telegraphic transmission equipment integrated with ECTT electronic telegraphic-telecomputer exchanges;
- TgC-46M and TgC-92 multiplex telegraphy equipment;
- telex terminals;
- system and facilities for modernized ECTT-R telegraphic-information service exchanges;
- an operating system for arithmetic telegraphic-information service equipment and networks;
- analytic and conceptual work on telegraphic, telecomputer, and remote-automation systems and equipment for telecommunications networks.

Such research will result in introducing into operation modern telegraphic switching equipment providing users with access to new kinds of services and improving the accessibility and quality of services. It should be emphasized that the work on transmission, switching, and subscriber equipment for the domestic public computerized network of computer information services, as well as the work on the concept and structure of that network, will be comprised within a separate central research and development program, "National Telecomputer Network," which is currently being drafted.

Technology of Electronic Systems for Telecommunication Needs

This subprogram comprises the development of hybrid integrated circuits for the needs of fiber-optics systems as well as for other telecommunications needs. The initiation of the related research will, along with assuring the production of specialized integrated circuits for the equipment and systems to be manufactured by the communications equipment industry, make possible the application of modern design solutions, miniaturization of tele-electronic equipment, a reduction in the materials-intensiveness and cost of production, and an increase in the reliability of equipment.

Automation of Systems Control and Maintenance in the Telecommunications Network

This subprogram comprises:

- network maintenance systems;
- automated power supply units for telecommunications;
- digital metrology.

The principal objective of the work on systems maintenance is to automate the maintenance of telecommunications equipment and networks and provide the maintenance services with modern facilities and new measurement techniques assuring a tangible improvement in the quality of telecommunications services. Given a rapid development of the telecommunications network, and especially given its automation, the traditional methods for monitoring its condition must be replaced with new techniques based on a broad use of microprocessor technology with analog-to-digital signal conversion, plus computer technology for the collection and processing of data.

Also envisaged is the development of a new generation of miniature, energy-efficient microprocessor-controlled power-supply devices.

The need for research into digital metrology is due chiefly to the large number of new types of digital measurement and testing devices introduced into operation. The related metrological research will be focused on developing and automating mensuration techniques, model instruments, and measurement stations.

Basic Research Into Developing Digital Networks

This subprogram comprises two main objectives:

- drafting the assumptions for a development strategy through conversion to a digital telecommunications network and integration of equipment and services as well as the development of longrange technical concepts and development plans for the telecommunications network based on rational engineering principles and economic and social realities;
- improvements in the existing techniques for computer simulation and programming of network development as well as development of new techniques, with the

object of ultimately drafting broad technical-economic analyses serving to define the optimal development conditions for telecommunications networks.

Prerequisites

A prompt and complete fulfillment of discrete CPBR implementation tasks hinges closely on access to modern components and equipment and on the allocation of foreign exchange for purchases in Payments Area 2 [capitalist countries]. Such funds will be earmarked for, in particular, the acquisition of special-purpose highly integrated circuits, programmed semiconductor memories, optoelectronic elements, suitable computer equipment, control and measuring apparatus, simulation devices, etc. It also is necessary to assure sufficient numbers of highly qualified experts and adequate premises for housing the facilities.

Preliminary analytic-exploratory and design work on certain research objectives is in progress and it should, during the first stage of its implementation, serve to identify the actual prerequisites. This concerns certain pioneering research projects, such as those pertaining to highly multiplexed digital teletransmission systems and pay telephones that accept credit cards.

The implementation of the CBR will be based on bilateral and multilateral foreign cooperation—chiefly with the countries associated in CEMA. A major role will be played by the PRL [Polish People's Republic] as a partner in the activities of CEMA's Permanent Commission on Communications (PCC) and Permanent Commission for the Radio Engineering and Electronics Industry (PCREE). Within the PCREE Polish cooperation pertains to the Uniform Digital Transmission Means System (UDTMS);, the Uniform System of Means of Commutation Engineering (USMCE), the Uniform System of Fiber-Optics Means of Data Transmission (USFOMDT), and the Uniform System for Mobile Land-Based Radio Communications (USMLBRC).

As regards the applicability of the research projects included in CPBR No 8.5, it can be basically considered assured, inasmuch as the organizations responsible for

that applicability were initially consulted about the related R&D topics. It must be stated, however, that the current status of domestic facilities for the production of certain equipment, especially of technological and measurement equipment, is unsatisfactory. The great complexity of the modern means of manufacturing telecommunications equipment poses special requirements which are extremely difficult to meet. For this reason, imports of that equipment—chiefly from Payments Area 2—are necessary.

The present article is confined to a brief discussion of the scope of the research comprised under CPBR No 8.5. It should be emphasized, however, that this research does not exhaust the entire spectrum of the telecommunications-related research work envisaged for the current 5-year period. The principal complement to CPBR No 8.5 is the corpus of government-placed orders relating to the development of telecommunications science and technology. These orders, which are closely linked to industrial applications, comprise topics relating to the development of both commutation (E-10, USMCE, ECTT) and teletransmission (USMDT, TN 2700, fiber-optics cable and fibers). Another major complement to this research is the ministerial R&D programs.

So far as basic research is concerned, some of it is included in CPBP [Central Program for Basic Research] 02.16, "Development of Data Transmission Technologies," and in CPBP 01.20, "Development and Utilization of Space Research" (more exactly, in Subprogram 01.20.5, "Satellite Communications," coordinated by the Institute of Communications). This research is a major complement to the whole of the research program in telecommunications.

It is worth noting that the program for research into telecommunications during the current 5-year period is broad and ambitious, and that its implementation would warrant the hope for a much more rapid than hitherto quantitative and qualitative development of the Polish telecommunications network and the Polish telecommunications industry.

TRINIDAD AND TOBAGO

Telecommunications Task Force Reports to Government

55400049 Port-of-Spain DAILY EXPRESS in English
20 May 88 p 7

[Text] The Task Force on Telecommunications appointed by Cabinet last June shares the view of the Teleproduction Association of Trinidad and Tobago (TATT) that licensing additional television stations here would have a positive effect on the broadcast industry.

TATT represents six major producers of local programmes for use by television.

"Over the last decade no new licenses have been issued to applicants to operate broadcast companies," the Task Force also states.

"In fact the undesirable situation exists today in which none of the broadcasting companies operating in Trinidad and Tobago posses a valid license."

In a White Paper on the establishment of a Telecommunications Authority, issued this week for public comment, the Task Force suggests positive effects of an increase in the number of television stations could include "an increase in the number of locally produced programmes and expansion in other areas, including employment."

It notes that 46 percent of national income in the United States was created by "information" workers, and that currently "more money is being spent in the field of communication technology than the programme for space research."

The Task Force maintains therefore that in a time of high unemployment, telecommunications could be an engine of development and a major source of employment and prosperity.

It says, also, that "local programmes transmitted by TTT peaked in 1975 at just over 40 percent," but currently the percentage of local programmes falls below 20 percent.

Napier Pillai, now with the Information Division, headed the Task Force. Other members included Winston Ragbir, REACT president Theophilus Alfred, Cecil Bernard of the Ministry of Legal Affairs, Franklin Brooker, Kenneth Gellineau, Alvin Lutchman, TTT programme manager Bernard Pantin, Deoraj Ramnarine of the Public Utilities Commission, Sheilagh Solomon of UNESCO, and coordinating secretary Annette Fitzpatrick.

The Task Force was mandated to produce the White Paper as a first step to establishing a Telecommunications Authority for Trinidad and Tobago. It was to investigate: "the use of airwaves with particular emphasis on the development and use of new technology, for example, satellites; the granting of radio and television licenses; and, all sound and visual broadcasting."

It has recommended, with detailed guidelines, the establishment of a Telecommunications Authority with all the necessary infrastructure after due parliamentary and legal process, and that "this Authority be placed under the portfolio of the Prime Minister because of its importance."

In appendices to the White Paper, the Task Force provides a draft Telecommunications Authority Act, and a draft Code of Ethics.

Among points stressed in the draft Code of Ethics are the need to maintain objectivity, to correct errors, and to accommodate all shades of opinion. "In the case of State-owned and controlled radio and television," the draft Code adds, "Government must be prepared to allow the media to deal in fair and constructive criticism," and to publish all relevant information, favourable or unfavourable, about its activities and policies, avoid censorship, and not manipulate public opinion by suppression.

As far as television advertising is concerned, the draft code of Ethics suggests that the "use of liquor and the depiction of smoking in locally produced broadcast material should be considered objectionable."

/9738

EGYPT

New Chief of Broadcasting Discusses Future Plans

5504603 Cairo AL-AKHBAR in Arabic 21 Apr 88 p 8

[Interview with Amin Basyuni, Chief of Egyptian Broadcasting, by Nawal Mustafa in Cairo; date not given]

[Text] In this interview, I had more than one question which required frankness and courage. The guest who was interviewed was truly candid and patient, and did not display uneasiness concerning controversial questions.

The interviewed guest, Amin Basyuni, assumed the position of chief of Egyptian Broadcasting one month ago. Despite the fact that he is a broadcasting veteran and was the deputy broadcasting chief, just like any other leader he has inevitably developed a different view of the situation, regardless of his experience.

[Question] The candid interview began with the question, or claim, that the broadcast media generates confusion among listeners during the month of Ramadan, leaving listeners exhausted as they flip their dials in the absence of any coordination, or definite plan. What is your opinion?

Amin Basyuni smiled, stating:

[Answer] During Ramadan, Egyptian Broadcasting presents a large amount of varied programming which encompasses all broadcasting material on all radio stations. This does not mean that we confuse the listener with an enormous quantity of series and programs. Rather, it means that we are providing listeners with a great opportunity to select programs according to their interests and special tastes. It is unreasonable to imagine that people can tune in to all stations simultaneously in addition to the three television stations.

We are using an integrated philosophy with regard to information services; each network has its special nature, distinctive message, and basic audience. Radio Cairo is directed toward all of Egypt, the Voice of the Arabs is directed from Egypt to the Arab region, Middle East Radio is for light listening and has an up-beat rhythm, the Second Program is a specialized cultural broadcast, the Noble Qur'an broadcast is of a special religious nature, and so on.

[Question] Is there anything new which you wish to add to Egyptian radio?

[Answer] Egyptian Broadcasting currently presents much information, cultural, artistic, and entertaining broadcasting material over its seven radio networks.

Each network has its special message and audience. The problem is not one of quantity, but one of the quality of radio offerings. This is a new aspect on which we wish to concentrate, God willing.

[Question] What are the features of this revamping?

[Answer] First of all, we wish to concentrate on improving the planning of program topics so that they will be more closely related to the basic issues of the country, and the concerns of the masses. We want to expand programs in which the microphone is taken to workplaces in order to engage the people in a dialogue about their problems and aspirations. In this way, we will bring the pulse of life to the man in the street.

We also want to concentrate on following events with up-to-date news and careful analyses in order to help develop mature public opinion, and a public which is aware of the challenges which encompass it. Our principle objective is to deepen our audience's sense of identity.

We also want to focus on expanding the production of artistic singing in order to counter the abundance of low-quality material sometimes produced by the private music industry. We will focus on concerts because they reflect the public's taste in music, and are a means for discovering new talent.

[Question] Permit me to ask you if Egyptian radio will attain the level of the British BBC, which clearly and objectively presents events simultaneously with pertinent background information and analyses as the events unfold.

[Answer] We can say without exaggeration that Egyptian radio is not inferior to the developed broadcast services of the world with regard to following events with up-to-date reporting and careful and objective analyses.

Egyptian information agencies, including Egyptian Broadcasting, currently proceed from a clear strategy which is based on letting the public know all the facts so that it will no longer need to listen to foreign broadcasts as much as before.

This is clearly exemplified by what happened during the disturbances; during this period, Egyptian Broadcasting was the principle source of information through which listeners could follow what was happening.

Egyptian Broadcasting currently has a large network of correspondents in all Arab capitals and in most of the world's important capitals. This network enables it to follow all important events in the world. The reports of these correspondents are heard daily following the news. Moreover, we have a weekly program called "Correspondents' Conference", in which we discuss an important

topic having different reverberations in a number of Arab and world capitals. A group of correspondents participates in the discussion, which is broadcast live.

[Question] When will Egyptian Broadcasting provide a fair or equal opportunity for the expression of opposition views?

[Answer] Egyptian Broadcasting actually provides an opportunity for the interplay of opposing views in numerous live and recorded programs. An example of a live program is the "An Opinion... and Another Opinion" program; for this program, representatives of opposition parties are invited every week to participate in a 45-minute discussion of our various problems. Other such programs include the "Picture from Parliament" program, and the "Picture from the Consultative Council." These two programs follow the discussions of members of both bodies, including representatives from all parties.

There are also programs which host specialists without regard to their party affiliation. These specialists contribute their expertise to a discussion of issues presented on these programs.

13286

INDIA

Details of Indo-Soviet Pact on Supercomputers

55500113 New Delhi PATRIOT in English
23 Apr 88 p 9

[Text] The Soviet Union has agreed to offer a supercomputer to India which would be comparable to the one being purchased from the United States.

This was one of the key elements of the protocol signed between India and Soviet Union for cooperation in the fields of computers and electronics.

The protocol was signed in the Capital on Friday at the end of the sixth session of the Indo-Soviet working group on computers and electronics.

The head of the respective delegations to the discussion Department of Electronics secretary KPP Nambiar and deputy chairman of the State Committee for Computer Technique and Informatics VM Neiman signed the protocol on behalf of their respective countries.

Briefing newsmen after the signing ceremony, Mr Nambiar said the Soviet side had agreed to give the specifications of the supercomputer ELBRUS-3-1 system and the EC-1068 computer system to the Indian side by the end of July 1988. After receiving a response from the Indian side the Soviets would make a commercial offer he said.

The Soviet side has invited a delegation from India to visit them in November 1988 to appraise them of the developments in the new computer techniques and products.

Mr Nambiar said that though they were still awaiting the technical specifications of the supercomputer, it was a system comparable to the Cray XMP-14 and other systems in the world.

The Soviet system ELBRUS 3-1 has a one or two gigaflaps capacity equal to about 1000 megaflops, and is the latest he said.

He said while the XMP-14 was being bought, this system was under the process of being bench-marked in India and only after that would they be able to say anything. As yet there was no commitment, he added.

Mr Nambiar hoped that the protocol, which covers cooperation between the two countries in the field of telecommunications equipment up to year 2000, would not only lead to an increase in the volume of trade but also balance the trade between the two countries in this area.

Both the sides have agreed to carry on research and development and supply results to each other which are mutually beneficial on the following products: digital multiplexing systems and optical fibre system, consumer radio electronics, radio electronic measuring instruments and test and measuring instruments and ground radio navigation and airport systems and means of telecommunications for civil aviation.

Some of the other areas are special telephones and special telephone exchanges for mines, equipment for marine and river radio communication and TV radio studio and outside broadcast equipment.

Further, both sides discussed the possibility of productions in India and the delivery to USSR of full set of equipment system for upgrading telephone lines in cities and villages.

Likewise, both sides also considered the possibility of delivery to India and manufacture in India with technical documentation from USSR on a commercial basis of special telephone apparatus for mines.

Possibilities of cooperation in the production of colour TV receivers and other consumer electronic items in USSR and India for supply to third countries, with the market being jointly developed by both was also considered.

Joint venture agreements on video tapes, and magnetic tapes are also likely to materialise in the coming months.

The Soviet side confirmed the interest in buying of electron guns for precision "in-line" colour picture tubes from India. For this a collaborative production of electron guns is proposed to be set up in India with the technical assistance of both and third countries.

The two sides showed interest in joint production of metal-ceramic packages (MCP) for integrated circuits. The Soviet side indicated that they have already finalised basic principles for setting up in India a joint venture company with Soviet technical assistance.

The two sides will also identify areas for joint cooperation in the field of automatic control systems for process industry in India, Soviet Union and third countries.

In the case of the steel industry, a delegation from India comprising DOE, steel authority of India and manufacturers would visit the Soviet Union during the second half of July 1988. The discussions would include identification of Indian hardware and joint development of process models for applications software for future exploitation of knowledge for Third World country projects.

/06662

European Ariane To Launch Insat-II Satellites

55500114 Madras *THE HINDU* in English
20 Apr 88 p 7

[Text] Bangalore, April 19—The European Ariane launcher has been selected by the Department of Space (DOS) for launching the first two of the second generation multi-service Indian National Satellite System, Insat-II satellites.

The selection has resulted from a competitive procurement process initiated in 1987.

The launch services agreement were signed by Prof. U. R. Rao, Secretary, DOS, and Mr. Frederic d'Altest, Chairman, Arianespace.

The second generation Insat satellites are being built by the Indian Space Research Organisation of the DOS for the Indian National Satellite System (INSAT), a multi-agency venture. The ISRO said a number of Indian industrial organisations and institutions are also involved. The design and construction of the first two Insat-II satellites, which are also known as the INSAT-II test spacecraft, is now in its 37th month of implementation. The first satellite is scheduled to be ready in the second quarter of 1990 and the second 12 months later. Three more Insat-II satellites are expected to follow. These satellites are also designed for compatibility with the proposed Indian Geosynchronous Orbit Launched (GSLV) which is expected to be available in the post 1992-93 time frame.

The Insat-II satellites, the ISRO explained, are larger in size, weight as well as in service capabilities than the Insat-I satellites. A lift-off mass for the Ariane launching is estimated as 1906 kg. They will be placed into geostationary transfer orbit (GTO) by Ariane-IV, the newest and the most powerful version of the Ariane launch vehicle using the spelda external dual launch bearing structure. For GTO to geostationary orbit raising, the satellites will use their own bi-propellant apogee boost motor (ABM).

The Ariane launch of the first two Insat-II satellites the ISRO said, are scheduled for the last quarter of 1990 and 1991, respectively, from the space centre at Kourou, French Guyana. These two Insat-II launchings will represent the third and fourth Ariane launchings of Indian spacecraft.

India's first geostationary communications technology satellite, APPLE, was launched by the third development flight of Ariane in 1981 under the cooperation agreement with the European Space Agency (ESA).

The launch of Insat-IC is scheduled on board Ariane flight V-24 in July 1988, the ISRO announced.

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Ministry of Information Issues 1988-89 Annual Report

55500115 Calcutta *THE TELEGRAPH* in English
20 Apr 88 p 4

[Text] New Delhi, April 19 (PTI)—Doordarshan and All India Radio (AIR) are planning to embark on a big expansion and modernisation programme during 1988-89, as revealed in the annual report of the ministry for information and broadcasting for 1988-89.

Doordarshan's plan includes commissioning of about 75 low-power transmitters, very low power transmitters and completion of programme production centres at Silchar, Dibrugarh, Tura, Kohima, Imphal, Aizawl and Shillong.

AIR's annual plan provides for the setting up of new frequency module (FM) radio stations at Shivpuri and Shahdol and local FM radio stations at Chittorgarh, Alwar, Jhalawar, Bhatinda, Murshidabad, Bilaspur, Raigarh, Khadwa, Chindwara, Balaghat, Beed and Betul during the same period.

According to an official summary released today, Doordarshan would commission permanent TV studios, equipped with colour production equipment at Hyderabad, Lucknow and Guwahati. High-tower transmitters would be commissioned at Shillong, 2x10 kw transmitters at Delhi and a programme production and feeding centre at Guwahati for telecast of northeast regional services.

It also provides for installation and commissioning of 10 kw transmitters at Delhi and Bombay for second channel service to replace the kw transmitters.

Commissioning of programme generation facilities at Raipur, Muzaffarpur and Panaji, programme generation centres at Jammu and Chandigarh, as well as transmitter buildings and towers at some places would be in progress during 1988-89.

AIR's annual plan envisages setting up a 300 kw medium wave (MW) transmitter at Suratgarh, 2x100 kw MW transmitters at Bangalore and Ahmedabad, a 100 kw MW transmitter at Vijayawada, 2x10 kw MW transmitters at Tura and 10 kw MW transmitters at Calicut and Bhopal.

It also provides for two 500 kw short wave (SW) transmitters at Bangalore, a 50 kw MW transmitter at Gorakhpur for external services, a 50 kw SW transmitter at Srinagar, 10 kw SW transmitters at Leh and Port Blair for regional short wave services, 2x3 kw FM transmitters at Nagpur and 3 kw SW transmitters at Indore, Pune, Bhopal, Hyderabad and Patna to replace the existing MW transmitters.

The report says AIR also plans to complete civil works and take up installation works.

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Minister on Expansion of Radio, TV Network
BK2305153288 Delhi Domestic Service in English
1430 GMT 23 May 88

[Text] AIR and television networks in the country will have large-scale expansion in the next 2 years. This was disclosed by the union minister of information and broadcasting, Mr H. K. L. Bhagat, at a press conference in Ahmadabad today. He said the number of AIR stations will go up from the present 94 to 205 and the number of AIR transmitters from 173 to 305 by the end of the current 5-year plan.

Mr Bhagat said the AIR will embark upon a new concept of broadcasting by commissioning a large number of district headquarters stations in the next few years. Referring to the speedy expansion of the television network, the minister said the number of TV transmitters will increase to 421 by the end of the 7th plan. It will cover 83 percent of the country's population.

Papers Report on Operation of Remote Sensing Satellite

Coverage Cycle Begins
55500111 Madras THE HINDU in English
6 Apr 88 p 4

[Text] Bangalore, April 5—The Indian Space Research Organisation has commenced a 22-day coverage cycle for its IRS-1A spacecraft for a countrywide repetitive coverage in its orbit.

It said that from April 4, the coverage began. In the next 22 days, one complete coverage of the country will be accomplished.

An ISRO press note said further orbit trimming manoeuvres will be continued to fine-tune the ground track of the satellite to coincide with standard reference schemes for a normal generation of data products. Additional firings of the thrusters would be carried out as and when necessary primarily to make such fine adjustments on the inclination of the satellite so that the local time of passage of the satellite at the equator on every day is kept within plus or minus one minute of the planned 10-25 a.m. The orbit control manoeuvres so far carried out have enabled the orbit to be circularised with a very small eccentricity of .0004 which is one order of magnitude better than what is envisaged for the mission. Such a small eccentricity value for the orbit will reduce effects of scale factor variations on imageries to negligible values.

That imaging the same points on the earth's surface repetitively with a given cycle time requires maintenance of stringent orbital parameters such as altitude and inclination for a spacecraft. IRS-1A is expected to cover the entire country every 22 days. In order to achieve a 22-day repetitivity for the IRS-1A, a sequence of orbit adjustment manoeuvres were carried out over the last one week. For this purpose the onboard hydrazine based reaction control thrusters were fired for a total duration of 78.5 minutes.

Major portion of this firing was carried out in three steps with an interval of two days between successive operations. Keeping such an interval is necessary to evaluate the effects of thrusting. This involved improved orbit determination using tracking data received during a number of passes after each thruster firing operation. In the first step, 25 minutes of firing of the thrusters was accomplished in orbits 181, 182 and 183 on March 30, during which proper visibility conditions existed over the ground stations tracking IRS. Similar manoeuvre was again carried out in orbits 210, 211 and 212 on April 1 for a duration of 26.5 minutes. Finally on April 3, a further 10 minutes firing of these thrusters was carried out in orbit 239. These three sets of major firings enabled the orbit to be raised leaving IRS at an altitude suitable for imaging with a nominal repetitive period of 22 days.

U.S. Claims Refuted

55500111 Calcutta THE TELEGRAPH in English
3 Apr 88 p 5

[Text] Bangalore, April 2 (PTI): The space commission chairman, Prof. U. R. Rao, today described as "wrong and ridiculous" a Washington report that the West German space agency had put back the Indian remote sensing satellite (IRS-1A) in safe mode after obtaining data from a U.S. space communications centre in Alaska, when the satellite's three-axis stabilisation was affected on March 26.

"It was Indian space scientists at the space control centre in Bangalore who evolved contingency plans after studying the anomalies and placed the satellite in the three-axis mode by issuing appropriate commands," he told newsmen.

Prof. Rao asserted that the spacecraft had at no time gone out of control as claimed in the report.

Prof Rao said the telemetry, tracking and command (TTC) station at Fairbanks in Alaska was used by ISRO only for acquisition of telemetry and tracking data and it could not issue commands.

In the TTCs in other countries, where the provision for commanding the satellite had been made, Indian scientists had been positioned and Indian-built equipment set up, he said.

Prof. Rao said the satellite, put into polar synchronous orbit by the Vostok launcher from the Baikonur cosmodrome on March 17, was functioning satisfactorily and all its cameras were working well. The spacecraft's in-orbit operations were progressing as planned, he said.

Prof. Rao said the mission control centre (MCC) at Bangalore was the nerve centre and central command for all operations concerning IRS. It was in continuous communication with the different TTCs carefully chosen for IRS-1A's operation. They included hired stations located at Fairbanks in Alaska, Wilhelm in West Germany, Malindi in Kenya and at Bears Lake in the USSR, in addition to the main stations at Lucknow, Bangalore and Mauritius.

These stations provided the necessary geographical coverage to monitor the spacecraft and provided the tracking data continuously.

Dr. Rao said the mission team at the MCC analysed the information received through dedicated communication links and decided on the courses of action in respect of controlling and operating the spacecraft. The mission team's decision were conveyed to the appropriate stations in the hired TTC network for implementation.

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Model Plant for Electronic Switching Systems

55500112 Madras *THE HINDU* in English
11 Apr 88 p 3

[Text] Bangalore, April 10—A model plant has been set up by the State-owned Indian Telephone Industries Ltd. (ITI) in Bangalore in association with the Centre for Development of Telematics (C-DOT) which will soon launch the first model production of a wide range of newly designed electronic switching systems based on the C-DOT design.

Announcing this here today, the Chairman and Managing Director of ITI Ltd., Mr U. D. N. Rao said the first production models of all types of electronic switching systems, including ESS (Electronic Switching System)-II, would be made by the Bangalore complex of the ITI at the model plant located in the electronic city near Hosur. The strategy was to make the first 128 lines 'Rax-a-day' (Rural Automatic Exchange) programme. About six months after the stabilisation of the first production models, the manufacture would be transferred to the Bangalore complex. The 512-Port C-DOT system would also be made by the model plant and after it was stabilised, it would also be made over to the Bangalore complex. The large ESS Max type of switches would similarly be made in the model plant and its production would be carried out in the hangar adjacent to one model plant.

The delivery of one lakh switching equipment would commence from 1990. The first models of main switches would be ready by next year, he said.

Mr. Rao said the crossbar and Strowger switching equipment being made at the Rae Bareilly complex would be phased out by 1992. ESS-III unit would be set up at the Rae Bareilly complex.

Satellite communication: The ITI had set up at Bangalore a joint venture with M/s Equatorial Pacific International Co. of the U.S. (ITI Equatorial Satcom Ltd) for the manufacture of low-cost satellite communication equipment (earth station) for data transmission using a special technology 'Spread Spectrum Multiplex Access' (SSMA). It was so cost-effective that the entire system could be designed for about Rs. 3 lakhs. A conventional earth station, could cost between Rs. 50 lakhs and Rs. 60 lakhs.

Electronic, code telephones this year: He announced that the full-scale production of Electronic Small Automatic Exchanges (ESAX) was scheduled to commence in 1988-89. The electronic telephone and code telephone, which was a fool-proof STD-barring facility would go into commercial production during the current year itself. The code telephone equipment would be distributed in Bangalore, Delhi and Calcutta as part of a pilot study programme within a month.

The low-cost Code Public Telephone Offices (Code PCOs) which would soon be located in different cities of the country, would enable the subscribers (who maintain accounts with the Telephone Dept) to dial local, STD and international calls by the use of individual codes given to them by the department. There was no question of the public tampering with Code PCOs as they would do with ordinary PCOs and therefore they would always be in working order.

The production of ITI-designed electronic push-button telephone would be launched within a month as the model had been tested and approved. This model would

be in addition to the pace model push-button telephone to be made with Italian collaboration. He clarified that the pace model telephone would not 'undermine or scuttle' the ITI-designed one.

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IRAN

New Kerman Ground Station Installed

55004710 Tehran RESALAT in Persian 19 Apr 88 p 11

[Text] Through the efforts of personnel from the FM television transmitter repair and maintenance unit, the eighth satellite ground station in Kerman province was installed and became operational. Transmitting at a strength of 10 kw, the station will extend the network to the collective village of Horjond in Kerman. According to a report by the Central News Unit, with the operation of this station the inhabitants of Horjond, Gurak and Jarek villages can from now on see the programs broadcast on the first network of the Islamic Republic of Iran on channel 8. 55004710-P

Radio Station Established in Dehdasht

55004709a Tehran KAYHAN INTERNATIONAL in English 11 May 88 p 6

[Text] Tehran, 10 May (KAYHAN INT'L)—With the allocation of \$21,000 (Rls.15m) a radio station will be established in Dehdasht, Kohkiloyeh and Boyer Ahmad Province.

According to the Persian Daily KAYHAN the new radio station will be commissioned by the Islamic Republic of Iran's Broadcasting (IRIB) in a 15,000 sq meters of land.

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Communication Center Becomes Operational

55004709b Tehran KAYHAN INTERNATIONAL in English 21 Apr 88 p 1

[Text] Tehran, 20 April (KAYHAN INT'L)—The Central News Bureau (CNB) in a despatch from Shiraz, capital of Fars Province, reported Wednesday that a new land-based communication center was put into service in the province.

The center transmits programs belonging to channels one and two of the Islamic Republic of Iran's Broadcasting (IRIB) throughout the province, CNB said.

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PAKISTAN

Memorandum Signed With French Satellite Agency

BK0206112988 Islamabad Domestic Service in English 1100 GMT 2 Jun 88

[Text] The satellite ground station of the Space and Upper Atmosphere Research Commission [SUPARCO] being set up in Islamabad will directly receive remote-sensing image data from a French satellite for research purposes. The data will be utilized by SUPARCO and 60 other user agencies in Pakistan.

A memorandum of understanding to this effect was signed in Karachi today between the chairman of SUPARCO and the president of the French satellite agency, the Spot Image.

With the commissioning of the station before the end of this year, Pakistan will be able to efficiently and directly receive earth and atmospheric data which will be used for geological survey, the location of precious mineral deposits, crop condition, prevention of floods and other fields of national development.

SAUDI ARABIA

Automated Switching Equipment From Ericsson

55002455 Stockholm DAGENS NYHETER in Swedish 5 May 88 p 14

[Text] Ericsson has received an order from Saudi Arabia for telecommunications equipment worth 526 million [Swedish] kronor. Included in the deal are telephone central exchanges, transmission equipment and buildings. Ericsson with its AXE system has been active in Saudi Arabia since the end of the 1970s, when the first large order for telecommunications equipment was received from the Saudis. "With the order we will have a dominant position in Saudi Arabia," said Anders Igen, who is in charge of marketing in Africa, Asia and Latin America. According to an Ericsson press announcement, this order was won for the company after competition with all the large telecommunications firms in the world. All telecommunications equipment included in the contract will be delivered from Sweden. Installation will take place during 1989 and 1990.

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EUROPEAN AFFAIRS

EC Policy Statements, Goals Outlined

Deregulation Timetable

5500a037 Luxembourg IES NEWS in English
Feb 88 pp 1-2

[Excerpt] At a press conference, held in Brussels on 24 February 1988, Vice-President Karl-Heinz Narjes of the CEC [Commission of the European Communities] presented follow-up actions to the Green Paper on Telecommunications. 1988 will be a key year in preparing for the advanced, cost-effective telecommunications infrastructure of the 1992 Single European Market.

After launching the first series of trans-European projects under the Community's 1.1 billion ECUs RACE program in January, the Commission has now taken a major initiative in opening up the European telecommunications market to wider competition.

The Commission's newly-published proposals are the operational conclusions of a wide-ranging public debate launched by the Green Paper on the common market in telecoms equipment and services, put forward by the Commission in June 1987. The basic idea and aim of the Green Paper is the establishment of a competitive Community-wide telecommunications market by 1992.

The Green Paper has been widely welcomed. This positive response has allowed the rapid preparation of a first series of follow-up actions, including a strict time schedule with the following main points:

- the complete opening of terminal equipment markets by 31 December 1990: a proposal on this subject will be submitted before end-March 1988;
- progressive opening of the market for telecommunications services from 1989 onwards;
- full mutual recognition of type approvals: a draft directive will be submitted before the end of 1988;
- full opening of the receiving antenna market (Receive Only Satellite antennas—ROS) before 31 December 1989, except where they are connected to public networks;
- the setting up of a European Telecommunications Standards Institute: agreement with the European Conference of Postal and Telecommunications Administrations (CEPT) has been reached; CEPT has already taken the basic decision to establish such an institute by April 1988;
- progressive implementation of post-oriented telecommunication tariffs;
- application of VAT to telecommunications (the 18th VAT directive is currently under discussion by the Council);
- full application of EC competition rules to the sector; the Commission intends to draw up corresponding guidelines;
- ensuring independence of procurement decisions of

telecommunications administrations and the opening of public procurement.

On certain other issues discussions will continue over the weeks and months to come. These include:

- a coherent European position regarding the future regulation and development of satellite communications in the Community;
- a concept for the promotion of Europe-wide services, by a market-led approach and definition of common tariff principles;
- defining a European position on the major international questions in telecommunications;
- developing the social dialogue and taking full account of social concerns.

EC Vice President's Address

5500a037 Brussels EC PRESS RELEASE in English
No IP(88) 95, 24 Feb 88 pp 3-4

[Article: "1988 Will Be Crucial for Telecommunications World-Wide—Caution Towards American Protectionism and Poor Access to the Japanese Market"; main elements of a speech made by Karl-Heinz Narjes, vice president of the EC Commission, at the International Consultative Forum about the telecom Green Paper, held in Brussels on 24/25 February 1988]

[Text] There can be no doubt any longer: the countdown to the single European market has begun and there are only 58 months to go. In this context, the information processing and communications sector represents a central piece: between ECU 500 billion and ECU 1,000 billion will be invested in the telecommunications sector by the year 2000.

Let us not forget that the European market in this sector will be the largest and the most attractive market in the world in the 20 years ahead: moreover, according to present estimates, by the end of the century the viability of up to 60 million jobs will largely depend on information technology and telecommunications services.

The world market for telecommunications equipment amounted to almost ECU 90 billion in 1986, the Community's share being ECU 17.5 billion. World turnover in telecommunications services reached nearly ECU 300 billion in 1985, ECU 62.5 billion of this falling to the Community.

It is obvious that the development of telecommunications in the Community, as mapped out in the Green Paper, cannot be seen in isolation from what is happening in the sector world-wide.

I would therefore like to make a few remarks on the world-wide context for European telecommunications, with particular reference to trade relations and the interdependence of markets in this sector.

The European Community is committed to the principle of free world trade and the objectives of the Green Paper bear out this commitment.

All trade is based on the exchange of goods or services between partners who complement one another. Partnership can no longer be said to exist where one of the partners attempts unilaterally to win advantages in certain areas.

This applies equally to world trade. Moreover, this principle is the basis of trade relations in the GATT framework.

The question of the future regulation of the telecommunications sector is, of course, closely linked to the development of international trade relations.

This link cannot, however, be taken to the point where the improvement and intensification of international trade relations is made dependent to a certain extent on the introduction of a specific regulatory concept.

In illustration, I will take the case of the Community's relations with the United States in the telecommunications sector. It is simply not true that the different regulatory conceptions (though still only in preparation) here and in the States have hitherto led to significant shifts in the balance of trade.

The re-regulation of telecommunications in the States has not in fact led to the American market being flooded with European products and services.

The volume of American and Japanese telecommunications exports are of approximately the same order as the Community's; the major difference is in imports. America's sectoral deficit is the result of the volume of the country's imports, which in 1985 were worth some \$3.2 billion.

Japan's sectoral trade balance, by contrast, has been extremely positive, owing to the negligible volume of its imports—these only amounted to \$123 million in 1985.

Fitting the European figures into this picture, the Community had a sectoral surplus of \$1.2 billion in 1986. But it was not earned in our trade with the USA and Japan, as the following figures show: the EC deficit in its telecom trade balance with the USA reached \$620 million in 1986, and our deficit with Japan, in this sector of trade was \$685 million in 1986.

These are the 1986 figures and our deficit with Japan in the telecommunications sector is now higher than ever. The same goes for the USA's trade with Japan.

The openness and absorbency of the European market vis-a-vis American products is a very significant factor in the USA's trade balance in this sector.

To return to Europe's \$1.2 billion surplus in 1986: we cannot take it for granted that this situation will continue. The European telecommunications industry will need to make considerable efforts just to retain its present position. It will, above all, need access to a large and absorbent internal market in order to remain competitive. A readiness to compete already exists. We trust in the efficiency and inventiveness of our firms. Even in the medium term, however, we are no longer prepared to accept a situation where we import vast quantities of telecommunications equipment from Japan while our firms are denied a chance of gaining a foothold in the Japanese market. Without genuine reciprocal access to one another's markets—as shown in actual sales—a serious conflict with Japan in this area is inevitable.

Japan too, will have to accept, and at last start to apply, GATT principles. One of the Community's main objectives in the Uruguay round is Japanese acceptance of the principle of give-and-take, which is already implied by its membership of the GATT. We have been patient for long enough. The pain barrier has been reached. A fundamental turnabout is needed. Quantifiable imbalances must be removed—just as Japan's partners could demand a change in the economic policy philosophy of which these imbalances are an expression.

As most of you will know, the Uruguay Round will also deal with the problem of trade in services and will attempt to arrive at a general framework agreement and sectoral arrangements covering such trade. One of these sectoral arrangements could—and in our view, should—concern services in the telecommunications sector.

The pursuit of multilateral arrangements does not rule out the possibility of bilateral arrangements, which, however, must be related to the multilateral talks and on no account be in contradiction with them.

To these ends we are playing a full part in the current GATT negotiations as well as in the activities of the ITU (International Telecommunications Union). Both organizations are well placed to structure the, at present, turbulent development of telecommunications world-wide.

The success of these multilateral endeavours will, I believe, depend not least on whether the major trading blocs and countries resist the temptation to conclude bilateral agreements aimed not so much at the legitimate safeguarding of national interests as at dictating the rules of the game to the rest of the world.

In saying that the multilateral framework agreed on will have to be capable of adapting to technological and market developments, I make no secret of the concern with which we are approaching the World Conference of Administrative Telegraph and Telephone, due to be held in Melbourne at the end of 1988, which will in effect map out the development of telecommunications up to the end of the century.

Not least in this connection, we are in regular contact with our American partners but we note with concern certain protectionist tendencies, which have eloquent advocates in Congress. We have no desire to get into a situation where, in reaction to protectionist measures in Washington, we have to insist on the stricter safeguarding and promotion of our interests.

Such a situation must be avoided—unless we are all to live with the consequences of the blow to world trade that it would mean.

The dramatic events on the world's financial and stock markets in recent months have shown all too clearly the extent to which economics and trade world-wide have grown into a complex system of interdependent relationships. This interdependence also means that responsibility must be shared—or borne jointly—and that a short-sighted defence of particular interests only endangers the cohesion of the system as a whole.

This sense of joint responsibility was badly lacking, for example, in the semiconductor agreement concluded by the United States and Japan in 1986, as we made clear to both parties at the same time.

This, unfortunately, did not prevent further important bilateral agreements being concluded between the two countries in other areas with a direct or indirect impact on European interests in the area of telecommunications. An example is the agreement on value-added services concluded in early 1987.

This has to be seen as an attempt to lay down de facto and without prior consultation rules and procedures which, in our view, ought to have been worked out on a proper multilateral basis, taking into account the various interests involved.

Here again, I believe, the Americans and Japanese have acted in a very short-sighted way: In the middle-to-long-term, their approach could destroy the existing network of international arrangements and relationships and work out to the disadvantage of those who originally thought to profit thereby.

1988 could prove a milestone year for international telecommunications, in particular, the World Administrative Telegraph and Telephone Conference (WATTC) in Melbourne will be an important milestone which will decide whether telecommunications are in the future to be the driving force in the development of world trade and the world economy that they could, and should, be; or if world telecommunications are to be the scene of new ruptures and battlelines, which can ultimately benefit no one.

The Community feels called on to make a constructive contribution to the WATTC. The Commission's preparations will accordingly be directed principally in the coming months at working out joint positions, positions

which express a readiness to help in the establishment of an equitable world telecommunications order. This will be done in a spirit of openness and cooperation, but a spirit also which expresses the determination of the European telecommunications administrations and telecommunications industry to articulate and defend their legitimate interests.

Official Statement on Competition

*5500a037 Brussels EC PRESS RELEASE in English
No IP(88) 99, 24 Feb 88 pp 1-3*

[Summary of an address by Peter Sutherland, member of the Commission of the European Communities responsible for competition policy and relations with the European Parliament, at the Telecommunications Forum in Brussels, 25 February 1988: "The Application of Competition Policy in the Telecommunications Sector"]

[Text] The weight and complexity of national telecom regulations is inhibiting the development of an efficient telecommunications industry in Europe and placing an intolerable burden on the European economy.

Private and professional users are still faced with an entirely uncompetitive, monopoly situation in the field of telecommunications. Most public telecommunication operators remain the sole purchasers of transmission, switching and receiving equipment and the sole providers of network facilities, telecommunications services and of user equipment.

Telecommunications are at the crossroads of future high technology and service economies. The changes that are taking place affect the very basis for future economic development in Europe.

The strengthening of European telecommunications has become one of the major conditions for achieving the internal market, improving the competitiveness of the European economy and strengthening European cohesion. The difference of interest between the competitive industry and the telecommunications monopolies is at the heart of the technological push for institutional change at European and national level.

It is within this context that the Commission, at the end of June last year, issued its Green Paper on telecommunications which aims at advancing an open, competitive Community wide market in this area and diminishing restrictive policies which hamper the ability of European firms to compete on a world wide basis.

Following the consultations on its Green Paper, the Commission is now embarking on its ambitious programme of opening the telecommunications sector progressively by 1992.

With regard to two essential parts of this programme, the Commission has decided to use the legal instruments available under the rules of the Treaty. Under Article 90,

the Commission is required to control the behaviour of public or privately-owned enterprises, to which member states give exclusive or special rights. Member states must ensure that there are no measures in existence in regard to such enterprises which would lead to infringements of the Treaty. Accordingly, the Commission has decided to issue, within the next few months, a directive on the liberalization of the terminal equipment market and before the end of the year, a second directive on the liberalization of telecommunication services, based on Article 90(3) of the Treaty.

In regard to the liberalization of the terminal equipment, the Commission will establish rules requiring member states to abolish the exclusive import and distribution rights which most member states have delegated to their national telecommunications administrations. Users in future will be free to choose the equipment they want and not be bound to one supplier. Consumers will be free to have the equipment installed by the supplier and have the maintenance done by a firm of their choice.

On the important question of the liberalization of telecommunication services, the Commission's directive will define the scope of the activities which can be maintained under monopoly of the state and of services which will have to be liberalized and may thus be provided by private operators. The Commission will seek to ensure that there is a separation between regulatory powers and commercial activities and the directive will establish the conditions of access to the network by independent, private operators. Procedures will be established to ensure that the Commission is kept informed of all new legislation the member states intend to implement, as well as financial arrangements between the State and public enterprises, in order to verify that no cross subsidization takes place to the detriment of users or competitors.

The Commission welcomes the enthusiastic support by the industry for the ideas which have been set out in the Green Paper. Support for the common objective of ensuring that Europe will have a healthy and competitive telecommunications industry. Europe cannot afford to maintain the monolithic and inefficient structures of the past. Only through market oriented enterprises with the flexibility to adapt rapidly to the swift technological changes of this industry can we hope not only to prosper but indeed to survive as a modern economic power.

EC To Open Telecommunications Standards Institute

5500a033 Amsterdam *COMPUTABLE* in Dutch
29 Jan 88 p 7

[Article by Ate van Eek: "EEC, CEPT Beat SPAG to the Finish: ETSI Standards Institute To Be Opened in Nice"; first paragraph is *COMPUTABLE* introduction]

[Text] Brussels—CEPT [European Conference of Postal and Telecommunications Administrations], acting on

behalf of the EEC, has beaten SPAG [Standards Promotion and Application Group] by creating ETSI [European Telecommunications Standards Institute]. Initially, neither industry nor users will be involved, although they will be at a later stage.

The proposal to create a European institute for telecommunications standards was formulated in last year's Green Paper, which outlined the EEC's plans for the further development of the European telecommunications market. By 1992 this market should be completely open in both the equipment and services fields. The Green Paper stipulated that ETSI, as part of these plans, be created by March 1988.

Apparently SPAG had doubts about the execution of the latter part of these plans. Therefore, in early December it launched a plan to create a consortium which was to concentrate on standardization in which the European PTT's, the industries not yet affiliated to SPAG, and the telecommunications users would participate. At that point, the initiative was regarded as an attempt to pressure the EEC to ensure that ETSI was created in time.

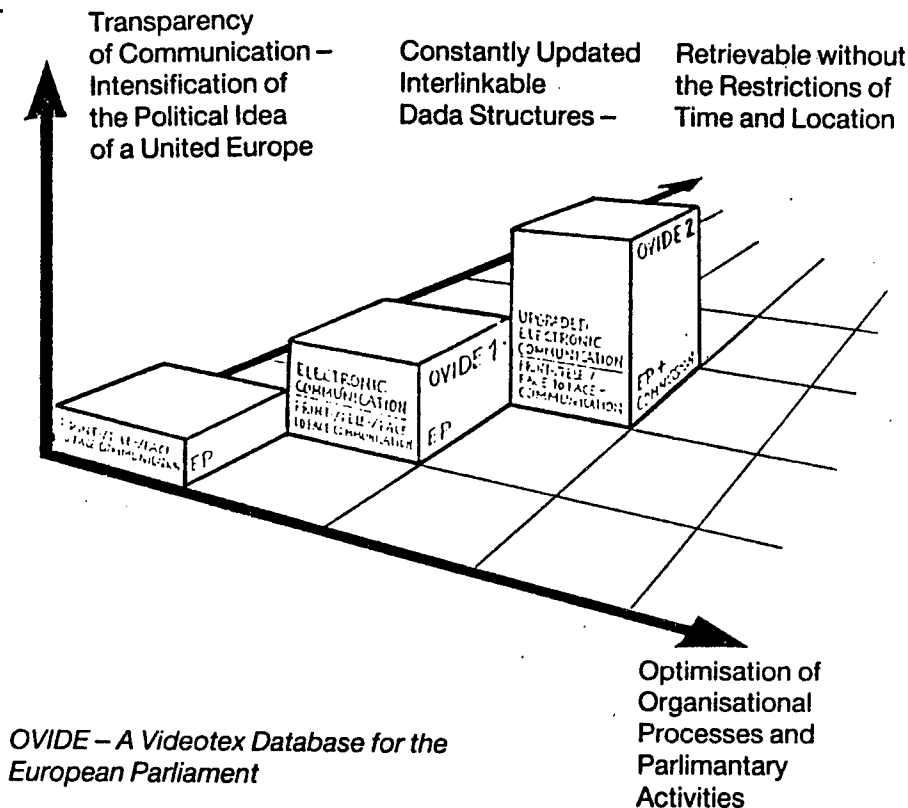
Control

More specifically, SPAG was afraid that political circles might delay the creation of ETSI. P. d'Oultremont, then managing director of SPAG Services, expressed this fear as follows: "The main problem (in creating ETSI, ed.) is to strike a sound balance between the PTT's and the other participants." The fear, already voiced in the European Parliament, that ETSI might be controlled by the wealthy PTT's could possibly delay its creation. This is what put SPAG into action.

Apparently the PTT's have again taken the lead. As representatives of the EEC—as a Netherlands PTT spokesman put it—ETSI was created as a result of their cooperation with CEPT. The institute, with a staff of 10 to 15, will be located in the Sophia Antipolis complex in Nice.

The aim is to gradually transfer the work of CEPT's commissions and subcommissions in telecommunications standards development to ETSI. All these activities should be coordinated from Nice.

For the time being industry and telecommunications users are not involved in ETSI, says the PTT spokesman, "but agreements have been made to involve them at a later stage." When this will happen, and how much say they will have in ETSI was not yet known when this issue went to press. At the moment there are no plans to cooperate with the American Corporation for Open Systems (COS) either, which SPAG had intended to do. The PTT spokesman, however, says that "this is not to be excluded in the future."



It is very doubtful whether this policy will effectively restrict the PTT's power in telecommunications standardization. It is clear they have tipped the balance mentioned by d'Oultremont in their favor at the cost of both industry and users. Let us hope that the EEC and CEPT made very clear prior agreements, because these seem to be the only means to have the PTT's give up their current lead and allow d'Oultremont's just balance to be established.

25023

EC Parliament Developing Videotex Database
5500a038 Luxembourg IES NEWS in English
Feb 88 pp 6-8

[Article based on information provided by the OVIDE management team, European Parliament, L-2929 LUXEMBOURG: "OVIDE—A Videotex Database for the European Parliament"]

[Text]

A. Activities of the European Parliament (EP) and General Objectives

Members of the European Parliament (MEPs) have three sources of logistical support in discharging their responsibilities as elected representatives:

- their personal secretariat,
- the services of the EP's Directorates-General (DGs),
- the secretariat of the political group of which they are members.

EP activities generally culminate in votes on motions. To this end, notes, reports, minutes, proposals and amendments are drawn up and distributed.

The EP's activities are organised on the basis of a four-week cycle of committee meetings, political-group meetings and part-sessions (2+1+1). At committee meetings, MEPs discuss matters which will be on the agenda at part-sessions.

The activities of the EP are concentrated in three cities:

- Luxembourg, where the Secretariat is based (with offices in Brussels and Strasbourg),
- Brussels, where committee and political-group meetings take place,
- Strasbourg, where part-sessions are held.

Liaison with the Commission and Council is most important.

B. OVIDE—Overall Objective

The overall objective of OVIDE, as part of the administrative infrastructure referred to, is to provide MEPs with an information and communications tool affording high-speed, round-the-clock access seven days a week—from anywhere in the European Community—to concisely formulated, up-to-date information. OVIDE is designed to be an easy-to-use, efficient facility for communicating with colleagues and staff, also affording public access and eliminating the delays and geographical constraints of their office. MEPs must also be able to access national videotex services from their terminals.

C. Background—The OVIDE I Pilot Service

The OVIDE I pilot service was launched at the October 1985 EP part-session, the main theme of which was new technologies, in collaboration with the Commission of the European Communities (INSIS [Inter-Institutional Integrated Services Information System] program); on the basis of a restricted target group comprising some 50 MEPs, the members of the Bureau and of the enlarged Bureau and the political-group and parliamentary-committee chairmen, it was designed to assess user acceptance of an electronic information and communications service.

This service is currently operated from the Commission's Computer Centre in Luxembourg on a Siemens-based system configuration comprising a mainframe and communication computers interfacing with local and remote terminals. System access from remote terminals is via various national videotex systems (Teletel, Bildschirmtext and Prestel) or directly via switched telephone lines.

OVIDE I provides users with various services, e.g. mailbox facility, information on EP part-sessions, up-to-date news agency despatches, and supports videotex terminals offering CEPT [European Conference of Postal and Telecommunications Offices] presentation profiles 1, 2 and 3 as well as ASCII terminals. Assessment of the pilot service by the EP demonstrated general user acceptance of the facilities and functions offered. Since the OVIDE I system was not originally designed to function as a videotex server, however, certain shortcomings emerged as regards performance, reliability and user-friendliness. Users have furthermore called for additional information and communications functions, such as document retrieval capability.

Some usage statistics may be of interest. The number of calls made monthly on OVIDE I more than doubled in the year ending July 1987 to exceed 3,500. The most widely used language of the four available (French, German, Italian and English) was the French version, with virtually all of the messages sent during July 1987 being in French. Other interesting details are the use made of Eurostat data and of the practical help services such as air and railway timetables.

D. Objective: An Operational OVIDE II Service

OVIDE II is to be based on the conclusions reached in the light of the OVIDE I pilot service; its principal objective is to simplify the dissemination of information to MEPs and facilitate communications among MEPs and between MEPs and their staff, the system being accessible from any of the 12 Member States of the European Community. Furthermore, access is to be provided for private users; information on the EP's activities will be available to them. System access will be both from local terminals installed on EP premises and from remote terminals in the 12 Member States; both MEPs and the public will be able to gain remote access to the system.

E. OVIDE II System Structure Recommended Unanimously by the 12 PTTs of the European Community

In the light of an assessment of videotex in the European Community and the resulting problem of laying down appropriate parameters on the basis of which OVIDE II should be developed, the Commission of the European Communities raised this issue at the round-table discussion between the 12 PTT telecom directors on 3 May 1985.

It was decided to set up an ad hoc committee to examine the problem of installing a Community-wide server for MEPs.

After a number of working sessions, this committee unanimously recommended to the EP, on 27 February 1986, a conceptional model for the OVIDE II system structure.

The technical specifications of the OVIDE II system are based on this.

F. OVIDE II System Configuration

The OVIDE II service is to be based on an "open" system architecture in a reliable configuration with high-convenience man-machine interfaces and high performance levels, the objective being to minimise response times. Figure 1 is an overview of the projected OVIDE II configuration.

G. OVIDE II System: Principal Characteristics

- Multistandard videotex and ASCII terminals supported;
- Access to OVIDE II via both in-house terminals and national videotex systems in the European Community on the basis of protocols specified by national PTTs and with the option of videotex interworking (CEPT TE-1 draft);
- Multilingual information management (in four languages) covering videotex page content, user prompts and system messages;

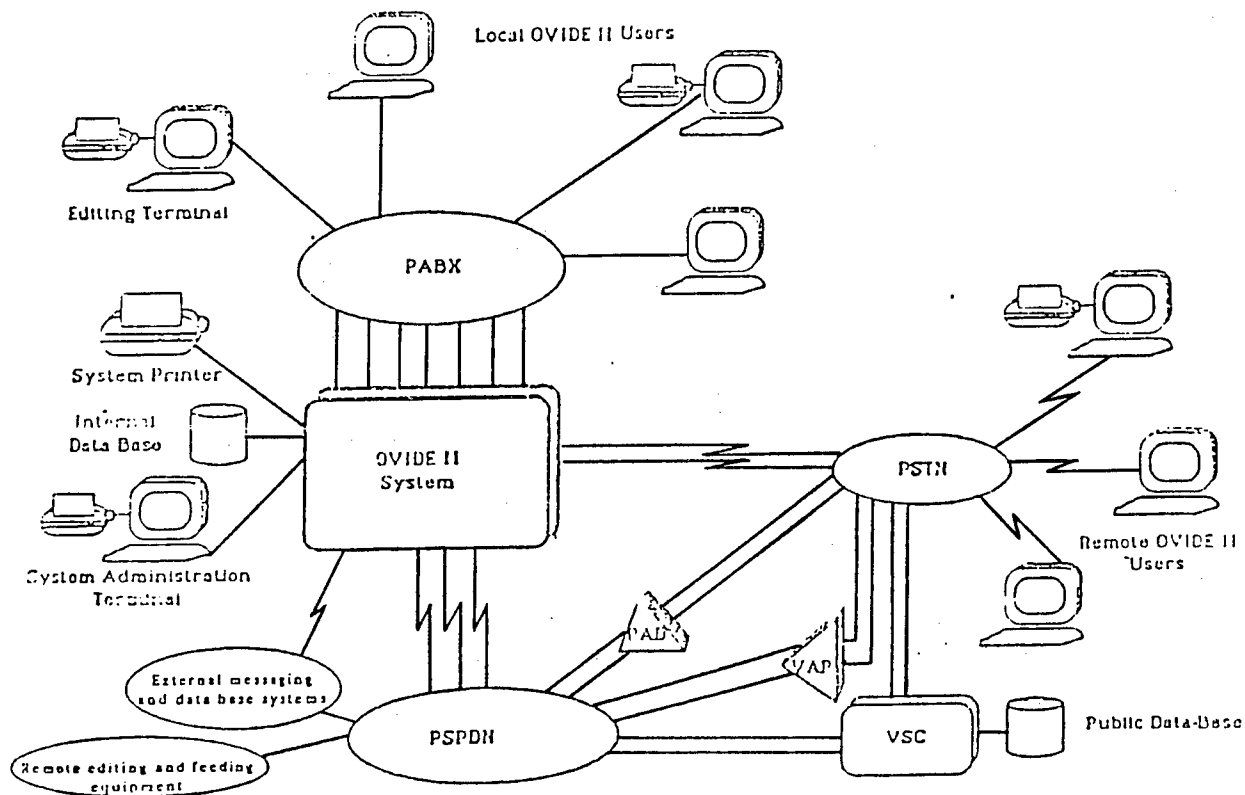


Figure 1. OVIDE II System Configuration Overview

- High-convenience user interface: a single interface to the various applications;
- Access control with hierarchical authorisation for protected information areas;
- Reliability (round-the-clock service seven days a week);
- High performance levels, e.g. average response time of 2 seconds;
- Initial configuration to be small;
- Initial configuration to be upgraded by adding functions and data sources.

H. OVIDE II Functions and Information Content

The following remodelled functions and facilities have been recommended in the light of the experience gained in the operation of the pilot service for almost two years, surveys among MEPs, assistants, political-group staff and the EP Secretariat, and, not least, user expectations, the objective being to establish an electronic information and communications service which will gradually become an integral component of the EP's infrastructure.

1. **Personalised message service**
 - Personalised tools

2. General in-house communications services

- Pinboard function
- OVIDE-supported teleconferencing
- Parliamentary telesessions
- Parliamentary teleservices

3. Public relations in the Community

- The 1989 elections and the Community public
- Public forums
- Opinion-polling
- Subject-specific closed group session
- Games and competitions

4. Practical information for MEPs (for use in-house)

- Logistical environment
- Professional environment

5. Practical information for external use

- Information for the public
- Information for the media

6. Media

- EP information generated by the Directorate-General for Information and Public Relations
- News agency despatches
- News agency bulletins
- Press review

7. Database gateways
—Document retrieval

I. OVIDE II Users

The following will be OVIDE II users:

- MEPs using their own terminals in their countries of origin;
- MEPs' assistants (MEPs to share their terminals with their assistants);
- EP officials, political-group staff and officials of other Community institutions using terminals installed in Luxembourg, Brussels or Strasbourg; these terminals are also for use by MEPs and their assistants;
- Members of the OVIDE system management team;
- Groups interested in the Community's activities, e.g. the media and national political parties (OVIDE II subscribers);
- All users of national videotex services in the European Community are potential OVIDE II users.

French-German Minitel Accord

5500a043 *Brussels EC PRESS RELEASE in English*
No IP(88) 98, 26 Feb 88 p 1

[Article: "Modems and the Minitel"]

[Text] Until the integrated services digital network (ISDN) comes into general operation, modems will be needed to convert digital into analog signals and vice versa—for instance, to connect computers via the telephone network. Modems currently represent about 7 percent of the terminal market, or some 500 million ECU for the market of the Twelve.

In a number of Member States, modems have been supplied exclusively by the national telecommunications administrations. This exclusive supply situation, which was contrary to Article 90 of the Treaty, is now being phased out.

At the same time, potential suppliers need to know the technical specifications for modems connecting various kinds of terminals over the various national networks. In some cases, these national specifications have not even been published. Now common specifications (NETs) are being worked out, constituting the basic blueprint for modems in the Community, and these are due to be published by July 1988.

One kind of equipment needing a modem is a videotex terminal, such as the French Minitel, which accesses the French videotex service Teletel. All the national videotex services are technically incompatible with each other. Teletel is incompatible with the videotex service next

door, the German Bildschirmtext. But Minitel could be used in Germany via private networks or to access Teletel via the German public network.

The two countries have now agreed to approve each other's videotex terminals, thus pooling two previously separate markets, and to hook up the necessary connections between Teletel and Bildschirmtext. Until the introduction of a new generation of internationally interoperable videotex, this is at least a good start on opening up a significant part of the terminal market.

This agreement follows a complaint brought to the Commission by France. The agreement covers:

- Approval of the Minitel terminal for connection to the German telephone network and of the Bildschirmtext terminal for connection to the French network. This will therefore allow access via each country's telephone network to the videotex network in the other country.
- Building a bridge between the Teletel and Bildschirmtext videotex services. This will allow access from each country, using its national terminals, to the videotex service in the other.

The bilateral issue between France and the Federal Republic of Germany therefore seems to have been resolved. However, at Community level one must draw the necessary lessons from the difficulties created by having to find retroactive solutions to problems of technical incompatibility.

BELGIUM

Broadband ISDN Project Complements RACE Program

5500a031 *Zellik TECHNIVISIE in Dutch*
3 Feb 88 pp 20-21

[Text] Narrowband ISDN [integrated services digital network], the technique for data and speech transmission, is a hot topic. These networks allow the integration of a number of services such as freephone. However, if a single network is to include services involving image transmission (e.g., digital videophone or teledistribution) in addition to speech and data, current transmission speed and bandwidth (64 Kbit/s) are no longer sufficient. The major European telecommunications companies have been preparing for this by developing broadband ISDN.

While mainly German companies have been developing circuit switching systems, Bell Telephone has been working on a new type of network since 1984: the ATD or asynchronous time division network. In mid-1986, the Belgian RTT integrated the ATD concept—a brainchild of CNET [French National Center of Telecommunications Studies] and Bell—into its R&D planning. This led to the creation of the joint venture BBA [Belgian Broadband Association]. BBA was founded to implement a

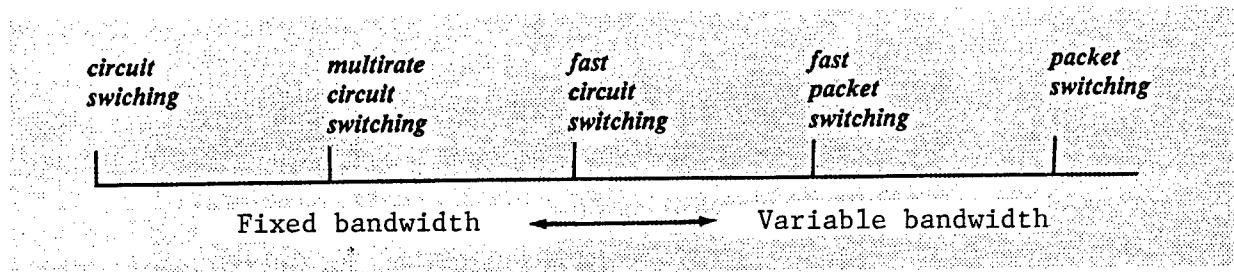


Figure 1. Switching Techniques

broadband ISDN pilot project for the RTT by 1991. The project was announced in September at Telecom Geneva, but a framework agreement was only signed at the end of 1987.

At the same time the European Commission approved a RACE [Research in Advanced Communications for Europe] research project submitted by Bell Telephone, the prime contractor, on behalf of the "ATD Technology" consortium. This project aims at developing components of the ATD network concept. Its approval confirms the Belgian RTT's choice of broadband networks, a choice which may be considered really farsighted.

More details were provided during a conversation with W. de Kinder, Bell Telephone's research manager and chairman of the BBA's executive board.

Figure 2. Advantages and Disadvantages of ATD [Asynchronous Time Division] and Circuit Switching

	ATD	Circuit Switching
Bandwidth use	Efficient: not dependent on traffic	Inefficient: dependent on initial dimensioning
Flexibility	Very high	None
Network structure layout	Single integrated network	Overlay networks per service

The Belgian Broadband Experiment

Since the beginning of telephone communication Belgium has been trying to lead this field. That is why ISDN's development from narrowband to broadband is closely followed. In early 1984 the Belgian RTT, prompted by the minister in charge, created a working group which was to set up an experimental broadband system by 1991-92. The aim was twofold: first, the creation of an industrial consortium responsible for development, and second, collaboration in this field with radio and television distribution companies. Unfortunately, the latter group is no longer participating for the time being.

Initially, the project focused on circuit switching, i.e., the interconnection of two users by a fixed path consisting of a copper connection including several switches. This option was also followed in the FRG.

But by mid-1986 the RTT changed its mind and opted for the ATD concept developed by CNET and Bell Telephone.

The broadband project could not be started until late 1987 due to the difficulties surrounding the "contract of the century" [contracts involving the digitization of the Belgian telephone network]. According to this contract, manufacturers are to supply equipment at low prices while the RTT is to grant annual subsidies of 1.3 billion Belgian francs for R&D contracts to industry. A large amount of this total R&D budget goes to the broadband project. The Belgian Broadband Association (BBA), composed of ACEC [Electrical Construction Works of Charleroi], ATEA [Antwerp Telephone and Electrical Works], Bell Telephone, Philips, and Siemens, is in charge of the project. The aim of this association is and will remain the development of a broadband ISDN model of the ATD type by 1992, based on Bell Telephone's research since 1984.

During the first year of activity, called the definition phase, the different types of interfaces will be unequivocally defined so that in later stages, the various subsystems developed by the other companies can be integrated.

Only then will the actual development and installation of the system start. According to plans this will take 4 years. The RTT is financing 80 percent of the research project.

The development of the broadband switch gear is mainly in the hands of Bell Telephone, while ACEC and Philips will primarily deal with the subscriber group equipment and ATEA with the subscriber premises network.

RACE Project

Bell is the project leader in this Belgian project carried out at the request of the RTT. Moreover, Bell was also recently selected as prime contractor in a RACE broadband ISDN project.

The composition of the consortium is also different. As many as 32 firms or research institutions are collaborating in the RACE project. Besides Bell Telephone, there are members of the Alcatel group (FRG, France, Italy, and Spain); various Philips divisions (e.g., the Netherlands, Belgium, France, and the FRG); AT&T and Philips Telecommunicatiebedrijven from the Netherlands; as well as major telecommunications and electronics firms and groups from all over Europe, such as IMEC [Interuniversity Microelectronics Center] (Belgium), ACEC (Belgium), Nokia (Finland), and STC [Society for Technical Communication] (UK). All these companies are backed by universities and research centers (the universities of Stuttgart and Athens and the prominent CNET). All European RTT's also participate, with the exception of those from Italy, Greece, and Ireland.

The RACE project on broadband ISDN networks will take 5 years and 700 man-years to come to a close. This represents employment for 140 highly trained persons coming from all the partners, obviously, during 5 years.

The goal of the project is the development and testing of a set of components acceptable to all partners, which could serve as a basis for an ATD network.

Because the consortium involved in this RACE program is so large and includes certain partners that are also members of the CCITT [Consultative Committee of International Telephone and Telegraph], the 1992 broadband ISDN standards are almost certain to differ substantially from those agreed upon within the ATD consortium.

Synergy Between the Belgian and the EEC Projects

Unlike the Belgian project the RACE project is not intended to develop a "working" model, but to reach a consensus on components. In this respect, both projects are perfectly complementary. The Belgian project will concentrate on the practical development and implementation of a network model and on the operational difficulties that may arise between the various modules. However, it should be stressed that neither of the projects will lead to "complete ready-made products." Both research projects are precompetitive. Only then will the various companies start developing real components also operating in the field which will be used to build the ISDN network of the future.

Broadband ISDN, When?

Taking into account all efforts undertaken thus far in broadband ISDN R&D, the inevitable questions are when exactly to expect the first development and how will it all be integrated in the current narrowband

networks. We cannot answer these questions. The RTT hopes that the first broadband networks will be operational by the year 2000, while a company like Bell Telephone would of course like to see it happen sooner.

25012

FRANCE

New Telecommunications Agreements With Germany

5500a045 Paris FTS—FRENCH TECHNOLOGY SURVEY in English Feb 88 p 1

[Text] Three major agreements between France and Germany have been signed in the field of telecommunications: the reciprocal approval of Minitel and Bildschirmtext terminals (French and German teletels), single invoice for clients with a transborder link, and the joint selection of a French-German telephone set.

Until this agreement was reached, the German market was closed to the French Minitel pending approval to German standards. It will now be possible to sell the Alcatel-TELIC Minitel terminals in Germany. The French Telecommunications Authorities expect that the market will reach several hundred thousand units within a few years. The Germans will also now have access to the 4,000 host computers already in operation in France providing the impetus for the development of private host computers in Germany which will then also be accessible from France.

Another factor in the development of closer ties in the area of telephone usage in the two countries will be the introduction of an identical telephone set manufactured in both France and Germany and a Telecom card that can be used in public telephones in both countries. The following are areas in which a common strategy is being developed for new services:

- a single sales point for companies to contact when installing digital links for data exchange,
- joint (DGT/Bundespost) subsidiaries to market the added value services offered on an international basis.

Lastly, joint concrete projects have led to significant results in the area of mobile radiocommunications and a fiberoptic link between Karlsruhe and Mulhouse.

Two other standardisation projects are now being examined: a terminal that will be available in both countries and a joint specification for a 2.4 Gbit/s fiberoptic system.

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