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Digital Mobile Telecom Mission to China

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It now appears that China's mobile telecom subscriber base will have grown 200% during 1993 (compared to unofficial predictions of 60%). At the end of October, according to a count issued by the Ministry of Posts and Telecommunications (MPT) in Beijing, there were 520,000 subscribers, up from 176,000 at the end of 1992. The equipment vendors and system operators are having a great deal of difficulty keeping up with demand.

To better tap this market, Industry Canada, in cooperation with Foreign Affairs and International Trade Canada, organized a mission, led by David Mulcaster, Director General of Communications Development and Planning focused on the field of Digital Mobile Communications (see appendix for list of mission members). The mission was held under the Memorandum of Understanding signed by the former Department of Communications with the Chinese MPT in May, 1993. Like other technical missions held under the MOU, the goals were to share technical information with the Chinese, expose them to Canadian expertise, and to give the Canadian participants an opportunity to gauge the state of telecommunications in China. The mission took place a year and a half after a digital mobile mission from China visited Canada, sponsored by Northern Telecom.

Disclaimers

The information in this report comes from verbal discussions with officials of the Chinese Ministry of Posts and Telecommunications (MPT) at the national, provincial, and municipal levels, as well as from government and industry telecom people in Hong Kong. As is the case of discussions of this sort, the information tends to be anecdotal, and the sets of statistics may vary in completeness or focus from one region to another. The number of cities visited was too small to be considered representative of the country in a mathematical sense. However, the goal of the report is to provide, not an accurate statistical picture, but an indication of the current state of mobile communications, and some idea of the short-term future. The opinions given in the report are those of mission members, and not necessarily those of the Government of Canada.

National

As mentioned above, there were thought to be 520,000 mobile cellular telephones in China at the end of October 1993 (up from 176,000 at the end of 1992), with the majority using the TACS standard (public AMPS systems have been permitted in five provinces, private AMPS systems are in use in other provinces). However, as mobile telephones are under the control of provincial Post and Telecom Authorities (PTAs), which may or may not

be prompt and accurate in reporting the size of their subscriber base to Beijing, the actual figure may be larger. Anticipated growth rates for the number of cellular telephones in service are hard to come by. They are not issued by the MPT, perhaps due to the fact that the rapid growth is difficult to predict, and will depend, in the long run, on the ability of the PTAs to lower prices to maintain the current growth rates of 100-200 percent.

Paging systems are run competitively by a number of companies throughout China, sometimes without licenses from the MPT (although there is currently a crack down on unlicensed operators). These systems are very popular, with high rates of growth. At the end of 1992, 2.2 million pagers were in use in 1073 cities throughout the country. Roaming remains a big problem due to the number of independent companies involved in the industry.

The official standard for digital mobile has not yet been selected in China. The selection of the standard is the responsibility of the MPT authorities in Beijing, and for some time it has been assumed that GSM would be the choice. Some believe that the delay in the choice may be due to second thoughts (or lobbying?) in favour of the emerging CDMA standard. This has created some friction between the southern provinces (principally Guangdong) which are rapidly approaching spectrum saturation with TACS, and would like to get on with establishing their GSM networks. Guangdong is planning on taking delivery of several trial GSM systems, from different manufacturers, early next year. Shanghai has arranged to purchase its first GSM system to be commissioned in 1994 as well.

There is also a problem with standards for CT2 telephone service—this time in terms of frequency allocation. While 864-868 MHz is the normal frequency for CT2, China uses 864-866 for trunk radio which is used by senior government officials. China National Radio, which is responsible for spectrum allocation, is said to favour establishing CT2 at 839-843 MHz—resulting in China requiring special CT2 handsets incompatible with those in other countries. The MPT would prefer a smaller frequency change—lobbying for 866-870 MHz.

Despite the lack of formally approved frequency allocation, there are fourteen CT2 systems starting up or in operation in China (the first starting in Shenzhen in 1992). Another fifteen operations are expected to start up in 1994.

In all the cities visited, and indeed in cities visited in previous visits, there are waiting lists of up to eight months for cellular service, despite the fact that service can be poor as more telephones have been sold than the systems have capacity for. Problems with getting a line is a current frustration for cellular users throughout China. The push to digital cellular is driven by the desire to increase capacity, and is driven particularly by those in Guangdong, which has, by far the highest saturation of cellular telephones.

Beijing

The central office of the Beijing Radio Telecommunication Bureau is housed with the MPT's International Centre. At this location is much of the paging equipment, cellular

switching equipment and Motorola and Ericsson base stations, as well as the DCME equipment and Ku band ground station for their international gateway.

The office has 400,000 lines of automatic paging capacity, of which 150,000 lines are in use. Some bureaus with which the Beijing Bureau works are still using manual systems, although these will be replaced by 1994. The interface between the manual and automatic paging systems was provided by Northern Telecom.

The Beijing Bureau runs a Unipage voice messaging system linked to an NT PABX. The Bureau Chief would welcome Canadian bids for voice messaging systems, emphasizing that there are real opportunities for small companies in this area.

Other areas that could be of interest to Canadian suppliers include Ku band earth stations, (the Bureau recently paid ¥18 million¹ for two E1 (64 channel) earth stations), fibre cable and equipment, multiplexers and demultiplexers, facilities management systems, and new paging systems (the Bureau thinks highly of Glenayre's reputation).

Shanghai

Mobile communications revenue makes up 10 percent of Shanghai's telecom revenue, well behind the revenue from long distance calls. With 32,000 cellular telephones, Shanghai officials were expecting to have 60,000 subscribers by the end of 1993, 200,000 to 250,000 by the end of 1995, and 500,000 by the year 2000. By the end of the decade, it is expected that 70 percent of the subscriber base would be using digital systems, analogue having reached saturation point at around 6000 channels.

These figures compare with 1,000,000 lines, fixed and mobile, at the end of 1992, expanding to 2.5 million in 1995, and 5 million in 1997, when one million of these lines will be in Pudong, the new industrial park currently under construction. There is a waiting list of 500,000 for telephone service in Shanghai, with the waiting time varying considerably from one area to another—being as long as three to four years in some areas. In 1994, the Shanghai PTA plans to spend ¥3 billion for telecom equipment, 40 percent of which will be for imports.

Cellular telephones cost ¥12,000 plus a ¥6,000 installation fee. Monthly charges are ¥120.00 plus ¥0.40/minute. The Shanghai PTA would like to reduce the handset charges to ¥7,000 or ¥8,000, while raising the calling charges. Ninety percent of the handsets sold are hand-held units (up from 70 percent at the time of the introduction of cellular service).

There are currently two TACS systems in operation in Shanghai, one from Motorola,

¹In the last week of 1993, China dropped its double exchange rate, leaving only the renminbi (RMB or "people's money"). The RMB exchange rate at time of writing was ¥8.7 to the US dollar, or ¥6.6 to the Canadian dollar.

the other from Ericsson. The Motorola system currently has 500 channels, with another 750 channels installed, and undergoing testing, and 19 base stations. The switch is being upgraded from an EMX 500 to EMX 2500. Roaming is being established with nine other provinces and two municipalities which use Motorola equipment as well as with Hong Kong.

The Ericsson system has 590 channels and 22 base stations (30 by the end of December 1993). There is no roaming available for those whose phones are linked to the Ericsson network. A Harris Farinon microwave system for communicating between base stations and the central office is working well after being purchased when the Motorola Starpoint 2000 system would not function as expected.

The Shanghai PTA is planning the introduction of a 17 base station, 10,000 line GSM system for 1994. They are looking to Siemens which is planning to establish a joint venture for GSM equipment in Pudong.

Pudong, the new industrial park mentioned above, is scheduled to have a telecom infrastructure equal to that of Hong Kong by the year 1997. The plans for Pudong call for the building of 155 office buildings plus a teleport. The Shanghai telecom authorities mentioned that they will be requiring telephones, mobile equipment, datacom systems, information services, data bases access systems with multimedia capabilities, video conferencing technology, control centres, and the technologies to establish "intelligent buildings".

Guangzhou, Guangdong

Guangdong province is China's centre for mobile communications. With 200,000 users of TACS-based cellular telephones, the provincial PTA now gets more revenue from mobile communications than from long distance service.

The province is currently in its eleventh round of expansion which, when completed in June 1994, will result in a network with 14 switching centres throughout the province, 22,000 switching channels, and a capacity for 600,000 subscribers. This will not be sufficient to meet demand. The twelfth round is now being planned to increase the capacity to one million lines by 1996. The officials have expressed a need for the best that digital technology has to offer for this round. To this end, they are installing GSM systems from four manufacturers (Northern Telecom, Siemens, Italtel, and Ericsson) as a commercial trial. NT's system will have six base stations, serving Huizhou, Huidong, Huiyang, Dayabay and Bouluo, Siemens will have nine base stations, Italtel six stations, and Ericsson 19 base stations, expanding to 41 stations relatively quickly.

The Guangdong PTA is caught somewhat in a bind. With the rapid growth of cellular service, the extra spectrum capacity offered by digital systems is important, as is the need to serve roamers from Hong Kong which has two GSM systems with a third being installed. However, as mentioned above, the MPT has not yet set the digital standard.

The Guangzhou Telecommunications Bureau is quite pleased with the Ericsson equipment currently in use, however, they mentioned that they are now looking for other suppliers with good service and price. One problem (common in other areas of China as well), is the time delay from ordering network equipment. While the manufacturers promise that systems will be commissioned within six months of ordering, delays of nine to twelve months are more common. As there are long waiting lists for service, the delays are costly to the telecom authorities.

The cost of mobile handsets in Guangdong, including installation, is ¥20,000, while monthly charges are ¥160.00, and the per minute costs are ¥0.60.

Foshan, Guangdong

An hour west of Guangzhou, Foshan has one of the most developed telecom infrastructures in China with 21 telephones per 100 people. The local PTA is responsible for 2.8 million people in the area, including the 380,000 in the city of Foshan itself. Despite the advanced state of their network, officials say that there is a desperate need for better communications.

Mobile communications started in Foshan in 1988, a year after service began in Guangzhou. With 30,000 cellular subscribers, Foshan is in the process of expanding their cellular system from 607 to 1830 channels serving the region. This will take their capacity to 100,000 subscribers. They are looking forward to 3.3% penetration rate in the city and 1% for the region as a whole in the not too distant future. They expect a one to five ratio between mobile and fixed-wire phones within a couple of years.

They use Ericsson's AXE10 system with the APZ211 switch. Roaming is available virtually throughout the province, although not yet from Hong Kong. As elsewhere in China, the goal of three percent blocking rate is not attained due to the system running at over-capacity. In Foshan, the actual blocking rate is between six and seven percent.

Foshan will be installing an Ericsson GSM system throughout their region early in 1994. The system will be rated for 5,000 users and will include six base stations in Foshan, and four base stations elsewhere in the region.

Foshan has 50,000 pagers in operation (out of a total of 350,000 in Guangdong province). The handsets, in general, cost ¥1,100, with a ¥30 monthly charge for alphanumeric pagers, and ¥2,800 with a monthly charge of ¥60 for Chinese character pagers. The Chinese character pagers cost US\$230 plus duties when purchased directly from Hong Kong. There is a strong popular bias in favour of Motorola pagers.

Even in this advanced area of China, there are few customers requesting mobile data services. The Foshan telecom authorities acknowledge the need, but say that for now, most data relies on fibre transmission.

Equipment, when it involves financing from the provincial level, is procured through the provincial PTA. However, as Foshan is one of the wealthiest cities in the wealthiest provinces, some of the money used for telecom infrastructure development comes out of the municipal coffers. In these cases, the Foshan PTA is responsible for procurement decisions, often using directed orders as opposed to tenders. All decisions on paging equipment are made locally, although much of this equipment is locally produced. This independence in purchasing is by no means the rule—potential suppliers must still do their legwork at both the provincial level, and if foreign financing is involved, at the national level.

Hong Kong

The Digital Mobile Mission presented a morning seminar to representatives of the Hong Kong telecom industry on December 6, 1993—an opportune time given the recent licensing of three companies to offer fixed-line telecommunications services in Hong Kong. Thus the companies entering or expanding their telecom infrastructure had a real interest in what the mission members had to say. The mission did not receive any overview of the Hong Kong situation as most of them have offices there, and are well on top of the situation. However, private meetings with representatives from the industry were arranged for other members of the mission. The following information is from these discussions. These notes are not intended as an overview, but rather as an update as the numbers are changing so quickly. A companion report on the three new fixed-wire licensees is available from the author.

CT2 is the latest mobile communications wave to hit Hong Kong, with service offered by Hutchison (with 50% of the customers), Chevalier, and Pacific Telelink. Earlier this year, it appeared that the market had been saturated at 35,000 subscribers for what was thought of as a "poor man's cellular". This image did not work well in Hong Kong's status conscious society. When the system was re-marketed as a pay phone in your pocket, and sold with a pager with "call parking", CT2 took off, and now has 110,000 subscribers, and 250,000 expected by 1995. (Call parking is a way of getting around the inability of CT2 systems to receive calls. A call placed to the subscriber's pager causes the subscriber to be informed that there is a call waiting for him. He then has 90 seconds to phone a number and be connected to the calling party.) Of course, the caller can always register himself with a local base station to receive calls if he or she plan to be in one place for some time.

Pricing is a key area to CT2 success. The original sets were sold for HK\$2,500 which proved a little high. Current prices range from HK\$1,600 to 1,800, with specials down to HK\$1,400. Subscribers are not likely to see CT2 as a potential replacement for their local loop-based telephone, until there is significant further decrease in price for both the handset and the base station.

Roaming, particularly from HK to Shenzhen is important (although some believe that roaming from Shenzhen to Hong Kong is not worth establishing). However, if China finally decides to use a different frequency for CT2, then roaming will not be possible.

There are 1.25 million paging subscribers in Hong Kong (although perhaps only 800,000 - 900,000 are active). This is equivalent to a 16% penetration rate, or 30% of adults. Chinese language pagers are becoming popular despite the minimum cost of US\$250 for the pager. Paging companies are now differentiating themselves through the types of services they offer. Personalized paging (with unique telephone numbers for each pager, answered by an operator who has the subscriber's computer file automatically on his or her screen), compete with systems that provide continuous stock market information, weather reports, lottery updates or horse racing information.

In discussions with Hutchison, we were told of the snags that have hit the implementation of their digital cellular service. They have found that their Motorola equipment for digital AMPS is not compatible with their analogue AMPS service—digital and analogue co-existence in the same spectrum, as is common in Canada, has not proved possible for them. On the 900MHz side, they have no seed spectrum to start their GSM service. The spectrum allocated to their TACS system is being used to capacity, thus it would require compromising existing TACS service to start up GSM service. (The original idea was to transfer spectrum from the analogue service to the digital service over the next few years.)

Comments and Recommendations

The Chinese mobile communications industry is in desperate need for equipment to expand their networks. However, the tendency is to purchase additional equipment from the furnishers of the original networks which, in the case of analogue mobile communications networks, is nearly always Motorola or Ericsson. Companies entering the market might therefore, consider equipment that would not normally be part of a package from one of these companies, or that would compete against inferior equipment from one of the network suppliers. Terminal equipment (cellular phones or pagers, particularly Chinese language pagers) and software for value-added services such as voice mail fall into the former category, microwave links from the base stations to the central office would be in the latter category.

It would also be important to establish oneself with current analogue mobile communications suppliers (Motorola and Ericsson), potential future digital cellular system suppliers (Northern Telecom, Italtel, Siemens and Ericsson) and/or CT2 suppliers.

In this market, ability to reduce the time between the signing of the contract and the commissioning of the equipment is extremely important. Can you deliver and install with a minimum delay? PTAs have waiting lists of customers willing to spend their high up-front fees to have access to the mobile communications networks. However, one company, experienced in the Chinese mobile market mentioned that despite this need for equipment quickly, it still takes about two years to establish one's reputation. During that time, one needs patience for developing the personal relations that are required. Local representatives are important, as is providing free samples of technical equipment and arranging export financing.

While foreigners are encouraged to participate actively in the Chinese market, there are still restrictions imposed on, and commitments expected from those wishing to enter the market. Foreigners are encouraged to form joint manufacturing ventures in China, preferably with considerable technology transfer. A company will likely end up with a privileged relationship with the province in which the joint venture is set up, an advantage that may not be useful in other provinces.

Foreign interests, including joint ventures, are banned from participating in telecommunications operations. While there are prospects for gradual change, particularly in Shanghai, it is unlikely that foreign ownership will be welcome in the near to medium term. The MPT has recently tried to reinforce these regulations, specifically targeting portable telephones, radio pagers, other cordless services, telephone information services, computer information services, electronic mail, electronic data exchange and image transfer services.

It is important to set one's prices to include engineering planning, software and consulting. Chinese customers often have trouble understanding that these aspects of a product must be paid for, rather than being provided as part of the ongoing customer-client relationship.

Small companies would be well advised to consider voice mail systems as well as paging. Due to insufficient capacity on the analogue cellular systems, there appears to be little interest in mobile data.

There are many sources for further information. Feel free to contact the author (coordinates on next page), Neil Clegg of the East Asia Trade Division of the Department of Foreign Affairs and International Trade (DFAIT), (613) 995-6962, Fax: (613) 943-1068 or Scott Fraser of the Canadian Embassy in Beijing (coordinates on next page). General information on marketing to China is available in DFAIT's "People's Republic of China: A Guide for Canadian Exporters", available from InfoExport at (800) 267-8376.

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