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DATANG

The Generation Gap

China's Slow Process of the Faster 3G Mobile Technology (P 14)

A prototype of 3G TD-SCDMA Phone
code-named "Sparrow", produced
by Datang Mobile

Food & Beverage Supplement inside (After P 22) | BizShanghai Journal just launched! (www.bizshanghai.com.cn)

The Generation Gap –
China's Slow Process of the Faster 3G Mobile Technology

By Mark Andrews & Charles Wiriawan

Four years after the world's first commercial 3G mobile phone system was launched licenses for the technology have not yet been issued in the world's largest mobile market. With Chinese companies already winning orders for 3G equipment in foreign markets what's the hold up in the domestic market?

Shanghai's Tomorrow

The plane touches down. You grab your laptop and head for the terminal. While waiting for immigration you turn on your mobile phone. A message pops up from Mr. Zhao saying he'll be late for the meeting. You wondered what he looked like, now you know thanks to the crisp video message. Glancing at your watch it's just as well he'll be late as immigration is taking its time. Finally you're through and have collected your waiting bag.

A driver is waiting for you at arrivals. As you're speeding towards the city, your thoughts drift to the evening's entertainment. How about a film? What's showing in town? You take a look on your phone and view the trailers. The comedy might be worth seeing.

With your thoughts miles away, the ringing of your mobile brings you back to Shanghai. Answering it you see your wife smiling at you and asking if you had a good trip. It's really good to be able to see as well as talk to her.

Does this all sound like a fantasy? Well, according to those in the telecommunications industry it is possible now with 3G technology. The problem of course is that Shanghai doesn't have 3G.

What Is 3G?

3G, as most people are aware, stands for third generation and is an International Telecommunication Union (ITU) specification. The first generation of mobiles were analogue and the second generation digital, consisting of the widely used GSM technology and the competing CDMA standard.

The defining feature of 3G is that it provides "broadband internet" for the mobile phone network. 3G offers higher download speed and increased compatibility. It supports download speeds of a few hundred kbps (kilobits per second) with speeds of up to 2 Mbps (megabits per second) possible in special circumstances versus 64-144 kbps data rate for 2.5G. This allows a whole range of services that previously were not possible such as video conferencing, mobile TV, digital music streaming or download service. The time for downloading a 3 minute MP3 song is rapidly decreased to somewhere between 11 seconds and 1.5 minutes compared to 6-9 minutes for 2.5G and a snail paced 31-41 minutes for 2G. This could take a serious bite out of Apple's iPod as phones begin to pack serious storage space and streaming music becomes possible. Similarly web-browsing speeds are rapidly increased allowing greater utility and increased productivity, especially when coupled with the typical 3G handset's larger screen.

Increased compatibility means that with a 3G phone there is the future promise of a far greater global roaming capability.

In October 2001, Japan's NTT DoCoMo launched their FOMA service, the world's first commercial 3G network. In June 2005, the service claimed nearly 14 million subscribers. Now 3G services have appeared in countries across the world, including much of Western Europe, South Korea and even South Africa.

There are two types of 3G technology in use. The FOMA system is based on WCDMA, the standard used in Japan and Europe. The other standard is CDMA 2000 1x EV-DO is used in the US and South Korea. In addition, China has registered its own TD-SCDMA (See "What is TD-SCDMA for more information on this technology) standard with the ITU in hopes that it might be used as a future 3G standard here.

A glimpse of Shanghai's 3G future is available at Alcatel Shanghai Bell's 3G Reality Centre (not open to the public). There, the latest technology is shown, with 3G handsets allowing laptops to surf the Internet. Phones receiving streaming video and music. Video conferencing between laptop and mobile phone. Phones used for surveillance such as monitoring a baby or car. In the Centre, they say speeds of 384 kbps are experienced, but during testing, we found that connections got disconnected quite often, especially when using mobile_phone-to-mobile_phone video conferencing. Officials at the Centre claim future downloads of 8-14 Mbps will be possible using technology currently undergoing testing.

China's 3G Hold Up

3G has caused a buzz with the technophiles in Europe and Asia.

However, despite speculation for years about 3G in China, the 6th Annual China 3G Mobile Conference was held in June, but still with no licenses granted.

According to Dave Carini of Norson Telecom Consulting the delay is due to a combination of cost, royalty problems, possible industry restructuring (see section on networks below), uncertainty of demand, and slow development with the home-grown TD-SCDMA standard.

Carini says that, "The government is hesitant to rush into a 3G spending binge, and it fears having too many operators building redundant 3G networks." Alan Hellawell, deputy head of research for Lehman Brothers Asia is quoted in Wireless Week putting the cost of 3G in China at over $90 billion. Carini says that Norson's estimates of the costs are much lower

There are problems with the need to pay foreign vendors royalties for intellectual property rights (IPR) with 3G standards such as CDMA

2000 1X Ev-Do (by Qualcomm USA) or WCDMA UMTS (by UMTS consortium). Carini says that "This could significantly raise the price of 3G equipment and handsets in comparison to 2G." The Chinese TD-SCDMA standard helps here in giving Chinese vendors some IPR than can be traded.

Duncan Clark of BDA China states that "consumer demand is unclear" and that in Europe the uptake of 3G was due to cheap voice calls, which China already has. Carini echoes this saying "Consumers are quite satisfied with the current level of services and are not behind the push to 3G - it is definitely the equipment and handset vendors who want to see it succeed." However, a June 2005 article in the China Daily claims that 3G will rejuvenate the fortunes of the industry. It cites research by Nokia undertaken in 27 cities saying that 15-40% of users are willing to use services not supported by 2G and that over 40% are dissatisfied with current value added services due to low transmission speeds.

What is TD-SCDMA?

TD-SCDMA stands for Time Division Synchronous CDMA and is the only mobile standard that incorporates time division technology for data transmission. The technology has been developed by the Chinese Academy of Telecommunications Technology, Datang Mobile, and Siemens.

China is not the first one to develop such technology, but so far the only one to continue to pursue it. UMTS (Universal Mobile Telecommunications System) consortium tried at an early stage to incorporate this "timeslot" technology into its WCDMA UMTS standard but failed.

Practically, the design of TD-SCDMA standard is more efficient compared to WCDMA because it allows for more efficient use of available bandwidth; as the amount of download data increases (such as when web browsing) more bandwidth can be allocated to that and as it shrinks it can be taken away.

Every technology has its strength and weakness, TD-SCDMA is no
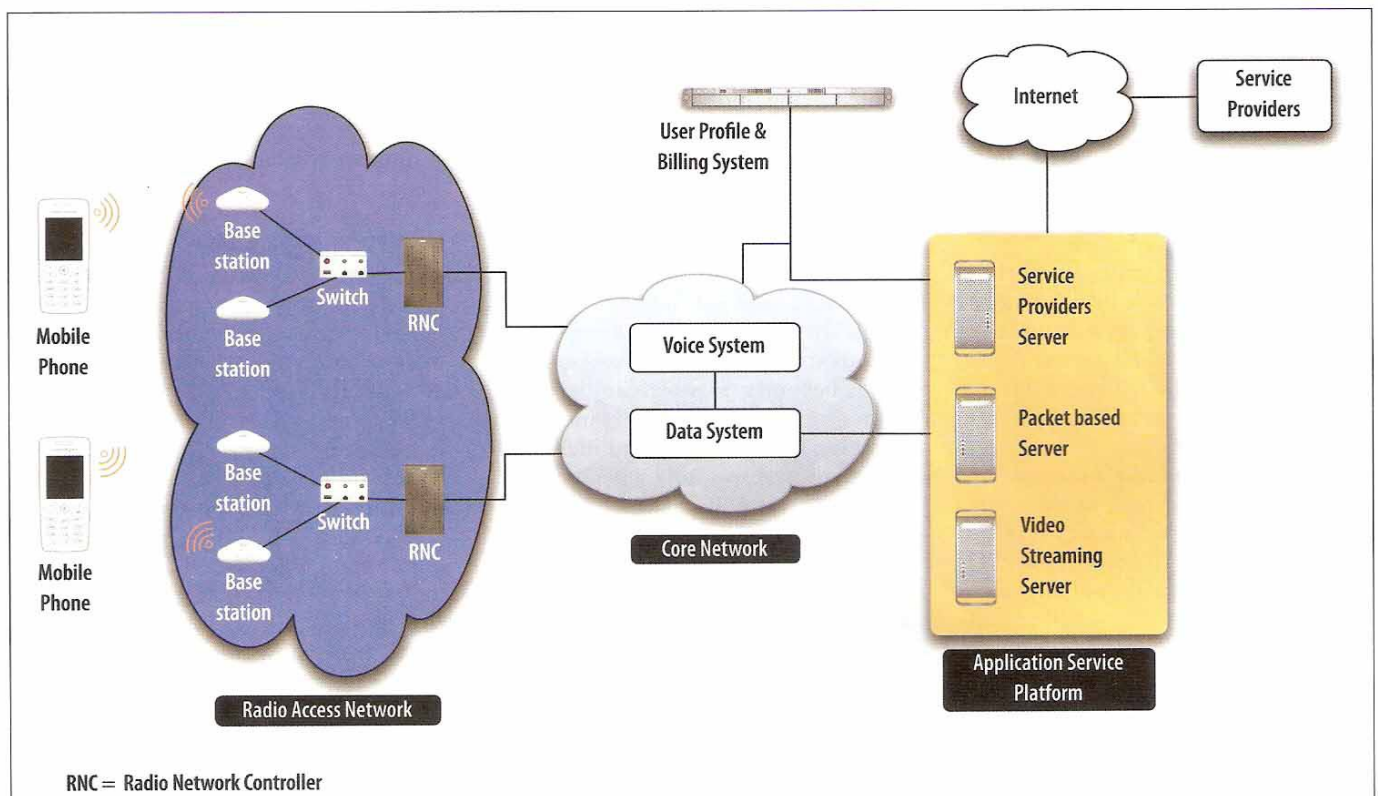
How 3G Mobile network works

RNC = Radio Network Controller
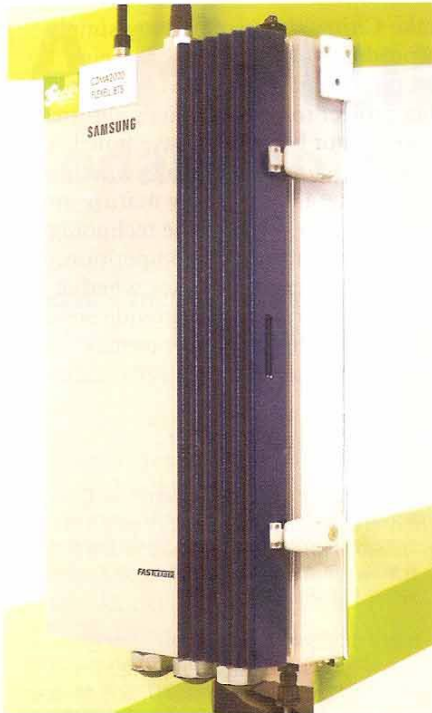
A small indoor version of CDMA2000 1xEV-DO network base station produced by Samsung

exception. In trials last year, according to Wireless Week, TD-SCDMA handsets interfered with each other, this is one of the drawbacks of time division method, interference can be created at a frequency which is directly connected to the time slot length (similar to the irritating buzz which can sometimes be heard if a GSM phone is left next to a radio).

However, now there is a brighter future for TD-SCDMA. After further trials were done in the first half of 2005, the standard is finally released for production. As of June 2005 the core equipment for TD-SCDMA network infrastructure, such as the base station and radio network controller, were already in mass production.

The commercial success of TD-SCDMA standard is still highly questionable. The standard hasn't been used in any commercial 3G network so far; while the more traditional but proven WCDMA standard has already been deployed successfully in nearly 70 commercial 3G networks around the world.

Network Operators

At the moment there are two mobile phone technologies in China, GSM and CDMA. China Mobile operates a GSM network only, whereas China Unicom has both a GSM and CDMA network. Clark says that licensing is currently one of the things stopping 3G in China as the radio spectrum has not been carved up among operators. In Europe this was done via auction leaving mobile operators with crippling charges. Dow Jones reports that the fees in China are likely to be much less and will split the standards among the carriers.

There are six companies that have been named as possible license recipients: the existing mobile operators (China Mobile and China Unicom), and possible new entrants China Telecom, China Netcom, China Tietong (formerly China Railcom), and China Satcom. It is highly unlikely that all six companies will be given licenses and that the companies will remain in their current form. There are rumours that China Unicom will be split up and its two networks distributed to different operators. It certainly does not have the resources to upgrade both its networks to 3G. Clark says that "It is expected that China Telecom and China Netcom will receive licenses for mobile services."

There are expected to be at least three and possibly four licenses. It is highly likely that one will be issued for each technology. China Mobile will likely get a WCDMA license and China Unicom, or if the rumours are to be believed whoever gets the CDMA network, a CDMA 2000 1x EV-DO license.

Most countries only use one standard; Korea however has both WCDMA and CDMA 2000. China however will be attempting to use three. Clark says that we are likely to "see a 'fudge' in the future with dual mode W-CDMA/TD-SCDMA being the most likely way of China claiming success of TD-SCDMA."

Industry insiders give licensing dates of late this year or early next. This

would mean operation of 3G could begin as early as late 2006. It is highly likely that 3G will be in operation in large Chinese cities before the Beijing Olympics. However, a report in China Mobile & Wireless News speculates that China may skip 3G and instead choose 3.5G or 4G, which give much faster transmission speeds and cheaper deployment.

Creation of a 3G network

China has previously rolled out technology across the country but Clark believes that 3G might be launched in coastal cities first. People would be able to use the GSM and CDMA1x networks for voice and data services where 3G is unavailable.

The creation of a network in a city such as Shanghai would possibly require over 10,000 base stations (each base station can cover about 2-3 sq km area) according to Wang Wei of Norson Telecom Consulting. These are needed to direct calls and data to users. A fixed-line network connects the core equipment that runs the entire network. Software and equipment now as a service platform would be needed to handle the voice and data services offered to users. Also a system known as BOSS (Back Office Support Systems) would be necessary to handle billing and other internal issues.

In reality, the job is much simpler for existing operators. The existing core network can still be used in a 3G network, the operator only needs to upgrade the RNC (Radio Network Controller), switches and base stations (see 3G network illustration). Equipment such as Alcatel's EvoliumTM uses the same basic structure, or platform, for all networks. This means that the same base station can handle multiple standards including 2G, 2.5G and 3G. All that is required is a software change. Therefore China Mobile would upgrade its GSM/GPRS network to WCDMA and whoever operates China Unicom's CDMA1x network would upgrade to CDMA2000 1x EV-DO.

Clark says that the software and business models are actually more
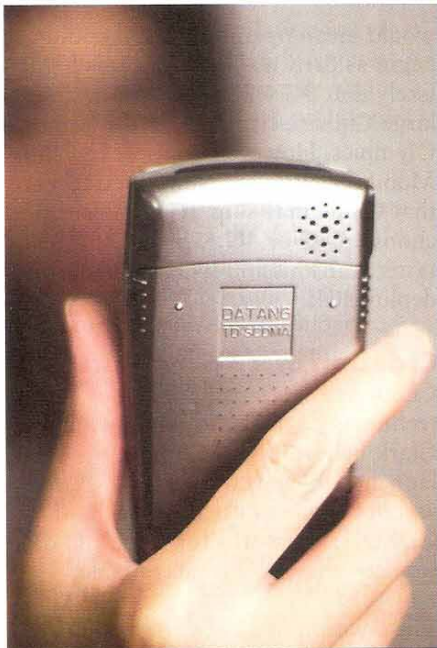
Datang Mobile's 3G TD-SCDMA prototype is fully functional in Alcatel's 3G lab area

important than the physical hardware for 3G.

3G Services and Applications

What kind of data services or applications can be developed for 3G phones? According to Angel Tang of Alcatel Shanghai Bell, whilst service providers "provide a lot of choices it depends on culture and end user behaviour. The end user has the final say in its use."

Hong Kong, however, offers some clues as to what will happen in the

mainland. According to a December 2004 report in Wireless Week mobile video proves with all the operators there to be the 'killer application.'

Wang Leilei CEO of Tom Online says that they (Tom) have an advantage in their one and a half years experience of providing 3G content in Hong Kong. He said that 3G in China "will be very successful." 3G will be a migration for the 70 million 2.5G users who are already familiar with using multimedia messaging. Wang thinks that they will readily take up other services made possible by 3G and flexible fees will aid this.

Affordability is a big issue. Recently, handset manufacturers have been trying to develop cheaper 2G models to gain new customers in China. These invariably have fewer functions, yet some 3G phones add more functions than even the highest end 2G phones. With market penetration of mobile phones still low in comparison to developed Asian markets such as Japan and South Korea where 3G has been successfully deployed, is there really a market?

The main obstacle to 3G in China seems to be the slow progress with the TD-SCDMA standard. With TD-SCDMA infrastructure equipment already in mass production, we can expect 3G licenses to be granted in China very soon (keep fingers crossed). The Chinese government is trying to

take China away from being simply a producer of technology to being an innovator. TD-SCDMA is the big project to prove China's abilities and cannot be seen to have failed. What remains to be seen is whether the market is sufficiently mature and developed to warrant the technology. Also, without foreign competition, it will be interesting to see whether Chinese operators can provide enough innovation in the market to make a success of 3G. ■

中国的3G产业

随着3G科技在世界各地的普遍化，中国作为一个不可忽视的潜力市场，其3G产业的开放已成为国际瞩目的焦点。中国的3G牌照还未发放，看来3G的启动还需要一定的时间，那么，中国的3G产业到底面临那些瓶颈呢？

中国的3G市场存在着很多风险。首先是技术开发风险。对3G相关的技术进行研发，企业需要投入巨额的资金，而一些项目的开发并不一定会获得成功。第二是标准风险。国际电信联盟目前确定的3G技术标准有三种：WCDMA、CDMA2000和TD—SCDMA，企业选择哪种标准需要冒一定的风险。第三是产业化风险。3G技术的开发和产业化在大规模的商用方面存在一定的风险，这个风险可能由技术形成，还可能由消费习惯形成，技术先进并不等于市场成功。

另外因为3G链条各方的关系，信息服务业发展的相对滞后，也可能会导致运营业和制造业经营的失败。第四是我国电信设备制造企业必须面对的特殊问题。中国的电信设备企业缺乏经验、核心技术少，目前存在的最大的问题是在技术开发阶段可能耗尽其所有的资金，即使技术开发成功，以后大量的制造费用、产品推广的费用，也会造成企业难以承担后续的技术发展风险，在产业化和商业化方面遇到新的问题。

相对于制造企业，运营企业面临的风险还要大得多，这种风险来自技术、服务等诸多方面，让用户放弃2G而改用3G需要一个过程，3G正式启动后，在很短时间内不大可能得到推广，这会给希望迅速得到利润的企业带来风险。

同时，3G终端在一定程度上阻碍了3G产业的发展。主要表现在以下几个方面：一，语音业务质量没有明显的突破；二，3G终端少，影响了应用的发展；三，终端产品的互联互通存在困难。

尽管3G存在着诸多的风险，3G为中国的电信设备制造业提供了一个新的机遇，有可能从根本上改变国内企业在技术上依赖国外的局面，甚至可能使中国逐渐成为电信设备制造业研发的强国，这无论从产业发展和经济利益的角度上，还是从产业安全和国家信息安全上看，都具有重大的意义。

为使中国具有自主知识产权的TD—SCDMA技术成为世界3G三大主流标准之一，中国仍努力地加强其国内3G产业化的建制，并在立足国内的基础上，作为一项产业革新，向世界范围拓展。
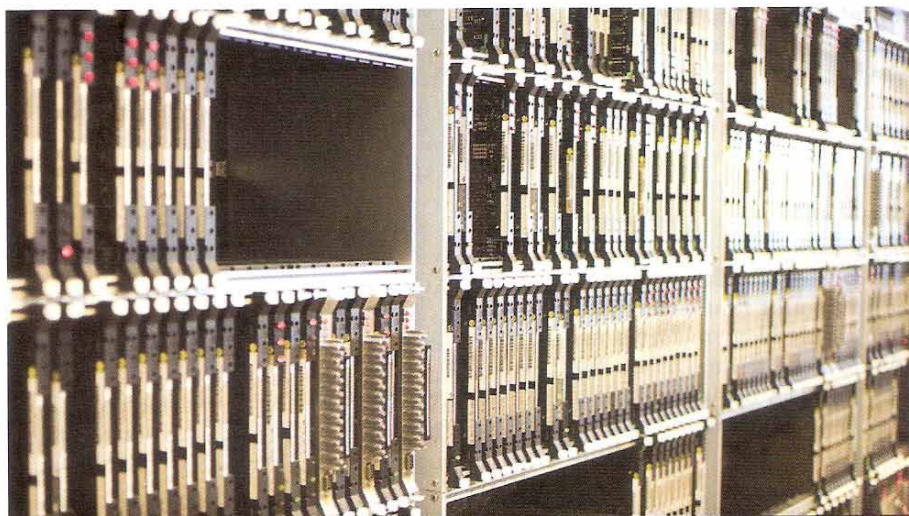
The Core Network of 2G or 3G mobile service network, core network this size can handle 800,000 simultaneous mobile connections