Status and Development of High-speed Railway Wireless and Mobile Communication, an Interview with Prof. Xuming Fang, the Chairman of Chengdu Section, IEEE Vehicular Technology Society

By Qinchuan Gong | Software Weekly

Prof. Xuming Fang is a member of IEEE Vehicular Technology Society, IEEE Information Theory Society and IEEE Communications Society. He is the Chairman of Chengdu Section, IEEE Vehicular Technology Society. He is currently the Department Chair of Communication Engineering Department in the School of Information Science & Technology, deputy director of Key Lab of Information Coding & Transmission, and deputy director of Mobile Communications Laboratory, in Southwest Jiaotong University.

Reporter: Could you describe the current status of wireless and mobile communication on the high-speed railway now?

Prof. Fang: It consists of two parts. One is professional communication and the other is public communication. Professional communication is essential to the normal function of railway operation, so it must be addressed properly. High-speed railway communication is an important part in the whole scheduling system. We call it GSM –R (Global System for Mobile Communications, R is short for Railway). According to international standards, the former name of the utility-service communication is GSM. With regard to the nature of railway operations, for example shunting (Shunting in railway operations, involves the process of sorting items of rolling stock into complete train sets or consists) is not a public service. We made improvements and put forward a standard GSM–R, which is very mature now.

Another part is public communication, namely train-ground communication. It means that passengers on the train can enjoy the same communication service as they do on the ground. As we know, 3G, 3.5G and broadband access technologies are becoming increasingly mature. More and more, train passengers need to log on to the Internet, receive or send emails or text messages while in transit. But the present high-speed...
railway communication technologies cannot meet their demands. Now there is no communication service system tailor-made for passengers. However, the government, the Ministry of Science and Technology, the Ministry of Communication and the Ministry of Railways are determined to make a joint effort to provide broadband services for the public. Research and development (R&D) work is already well under way.

The starting point of our research work is post-3G which is more advanced than the current 3G. Its test network is being displayed in the Shanghai World Expo 2010, which has shown several standards. The State wants to solve two major issues with the high-speed railway through by furthering this technology. One is frequency deviation, namely Doppler shift and another is fast switch. Some other problems will also be resolved at the same time. I can say there may not be another country who can master such an advanced technology to provide broadband internet services to passengers on a train running at a speed of over 300KM per hour.

**Reporter:** From what you said, I learn that the test network has been established. Then how long will it take to commercialize it?

**Prof. Fang:** It won’t be long. Now the major problem encountered in the test network is software adjustment and BUG testing. Performance testing and pressure testing are complete. And the test network has met rigorous testing standards. But the terminal equipment is still a problem. Currently some countries have started to commercialize it, such as Northern Europe. The technology of China is still in the leading edge. The equipment first used is provided from Huawei. And the Ministry of Railways has chosen several enterprises’ products for tests on the Wuhan-Guangzhou High-speed Railway.

**Reporter:** Could you please talk about the prospect of high-speed railway wireless and mobile communication?

**Prof. Fang:** High-speed railway communication is not an independent technology. It is one of the supporting services of high-speed railway. If such service is not available on the train, passengers have to tolerate low-quality communication service. But a ticket on the high-speed railway is sometimes even more expensive than a discounted air ticket. Hence, passengers justifiably demand better services such as wireless communication services. The customer groups attracted to the high-speed railway will surely demand the wireless and mobile communication services. High-end customers will determine the value of the high speed rail based on premium services such as access to the Internet, especially those business people who need to work wirelessly. This cannot be done by foreign countries because they don’t have such high-speed trains. China’s communication technology is comparatively advanced to other global regions. It has a good foundation and we’ve started post-3G, which puts us ahead of other markets. Moreover, it has full support from the State. It has sufficient capital support and a great potential market. Thus conditions are ripe for its success. It can also be exported to various countries around the world. So it will enjoy a bright future.