

# Beyond 3G -- ultra-fast mobile radio networks of the future

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(PhysOrg.com) -- Today's growing third generation (3G) of mobile data services are only a taste of what is to come. Now, European researchers are paving the way to a world where ultra-fast internet access is available from every mobile device.

What started out as a luxury item for high-flying executives is now a fashion accessory for teenagers throughout Europe, and increasingly, in the rest of the world. In November 2007 the number of mobile phone subscriptions passed 3.3 billion, more than half the population of the globe. In most EU countries there are now more mobile phones than there are people.

But the real growth today is in the mobile data communication segment, via new 3G digital networks being created by providers. Such 3G services include video telephony and broadband internet access. Industry sources report that the number of EU users of 3G services doubled to 112 million in the year to April 2008.

But what will the next generation of mobile radio networks look like?

The International Telecommunication Union (ITU) is proposing a new global standard, called IMT-Advanced, which aims to provide a coherent framework for all forms of digital wireless technologies, not just mobile phones.

WINNER II, an EU-funded project to explore how IMT-Advanced

might be implemented, is a continuation of the original two-year WINNER project (2004-2005) that evaluated promising technologies and came up with a first concept of what new infrastructure might look like. The role of WINNER II was to develop, optimise and validate that technology.

“The output is not a product, of course,” says Dr Werner Mohr of Nokia Siemens Networks, which coordinated the project. “The output is a very clear understanding of what the system should look like. The project has developed an entire system concept and a related reference design for a future air interface. This can be used as input for the standardisation process that is now starting.”

## **Consensus building**

The 38 partners in WINNER II included Europe’s electronic and telecoms giants as well as many universities. The participation of China’s telecommunications regulator in one of the work packages stresses the global importance of the research and the need to build a worldwide consensus.

The work has gone surprisingly smoothly, given the large number of partners and particular interests. Mohr attributes this success to the early planning for the first WINNER project in 2002-2003, before the industrial partners had invested in any technology of their own.

“No-one had anything to lose and therefore we could start a joint development of a new system where everyone could bring in their ideas,” he says. “We started more or less from zero so everyone could gain something.”

Last November the ITU’s World Radiocommunication Conference (WRC) identified frequency bands for future IMT-Advanced services,

opening the way for development to begin in earnest.

In the meantime, the WINNER II partners have also contributed to an intermediate standard called LTE (Long-Term Evolution), which will partly fill the gap until IMT-Advanced comes along.

“Technically there are synergies between LTE and WINNER II,” Mohr says. “Our industry partners went to the LTE standardisation and many organisations have taken WINNER results because we already achieved some consensus there. These kinds of projects are supporting consensus building.”

The technologies tested by the WINNER II team will allow future mobile devices to communicate at up to 100 Mbit/s, much higher than most present day fixed broadband speeds.

“Basically you’ll get in a wireless system a similar experience as in your office or your home,” Mohr says.

## **Challenge for industry**

The results from WINNER II, which was funded under the EU’s Sixth Framework Programme for research, will now be developed by the WINNER+ project, which contains many of the same partners and is part of the CELTIC cluster supported by the intergovernmental Eureka initiative.

So when can we expect to see these new capabilities? It depends on when the identified spectrum becomes available.

“In Europe this may not happen before 2015 though in some countries it could be earlier,” says Mohr. “It really depends on conditions in different countries and also on market needs, of course.”

Although European industry quickly took the lead in the 1990s by establishing and building the worldwide GSM standard still in use, Mohr cautions that the market in 2015 will be a very different and more competitive.

“In Europe we have a saturated mobile market,” he says. “Asia is still growing fast but in ten years they will also have a saturated market. The need then will be to improve the capabilities of systems. From an industry perspective we have to offer innovative solutions in order to stay competitive in the global market.”

He believes Europe can still remain competitive in such a market, so long as industry exploits its expertise.

“I think we have to work hard, of course, but there is a good chance because we have the people, the know-how and the means for this kind of co-operation,” Mohr says. “What industry has to do is invest in research and development in order to stay inventive.”

He adds: “Technology is always moving, it’s always improving. We can decide either to be in the group which is improving and innovating or we are not in that group. I think it’s better to be in the group that’s improving.”

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