

**Recommendations for Research Opportunities from the WTEC Study on
Wireless Technologies and Information Networks**

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The World Technology Evaluation Center (WTEC) conducted a focused study on "Wireless Technologies and Information Networks." The objective was to evaluate the U.S. competitiveness in this technology and identify the R&D issues that need to be addressed and supported by federal agencies to help enable this technology and realize its much-anticipated economical and technological benefits. A panel of eight researchers was formed and every effort was made to cover all the multidisciplinary research areas involved in this rapidly expanding and technologically diverse field of wireless communications. Panelists visited leading companies and experts in Europe and Japan, and organized a workshop to provide a forum for interaction with U.S. companies. The findings were presented in a workshop organized in September 1999 and were also published in a recent WTEC report.*

From the site visits in Europe and Japan and from interactions with U.S. companies, it was clear that the universal vision for next generation wireless communication systems is to develop "fully integrated (terrestrial wireless, wireline, and satellite), reliable, fully mobile, minimum latency, wide variety of services, low cost, and long battery life" systems. This is needed not only to support the phenomenal increase in the number of users, but also to enable and support the development of new applications in telemedicine and health care, wireless access to the internet, transportation, wireless access to digital libraries, and virtual universities.

In this presentation, the role of the electromagnetics community in enabling next generation wireless technology will be emphasized. Three members of the panel who participated in this study will summarize their findings in the following research areas: (1) hardware for RF front-end of wireless communication systems, (2) "smart antennas," and (3) "channel characterization and propagation models for wireless communications." In all cases, bottlenecks and research challenges will be identified and results of the comparative study between the U.S., Europe, and Japan in long- and short-term research will be presented.

* To obtain a free copy of this report, contact Dr. Geoffrey M. Holdridge, International Technology Research Institute, Loyola College, 4501 North Charles Street, Baltimore, MD 21210-2699.