Mobile Computing & communications

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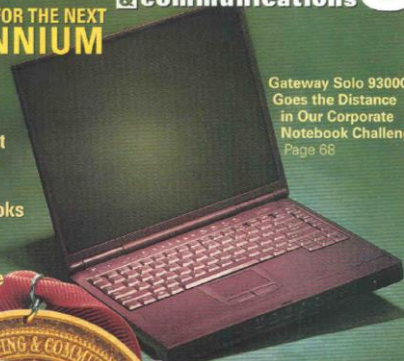
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Work on a network without an infrastructure is being done by Chai Keong Toh, professor of electrical and computer engineering at Georgia Institute of Technology (Georgia Tech) in Atlanta. Toh and his group of 14 students are aiming for nothing short of complete and seamless mobile computing at all times. "I'm trying to push this concept where you can form a network on the fly without reliance on any fixed infrastructure," Toh explains. "If we use mobile computing in the sense of being connectivity-aware, if we want to be truly mobile — we want to be on the move and do not want any strings attached — the only way we can do it is to go wireless, with radio, infrared or even sound waves." Transmissions above 5GHz remain unregulated by the FCC, so the sky's the limit at the moment.

Toh wants to eliminate the mobile disconnect. Cell-phone users are familiar with this hardship when they leave the vicinity of a base station and wander into an area that lacks a roaming partnership. Toh's emerging ad-hoc wireless technology aims to remove such a hindrance to true mobility. He uses WaveLAN technology as the underlying infrastructure. Lucent and RadioLAN donated wireless LAN (WLAN) cards, which provide 10- or 11Mbps of wireless throughput, so his team could create a network independent of a base station. Other industry heavyweights, including Dell and Microsoft, provided additional tools for the on-campus experiments.

Toh had to craft a new software communication protocol that enables his devices to form a wireless network spontaneously. An intelligent beacon identifies the services the unit can provide to neighboring devices and also offers other information, like remaining power levels. Using this type of system, a group of workers theoretically would be able to go out in the field and engage in real-time data manipulation. "They can identify themselves to the group to enable collaborative applications, to actually improve work flow through this mechanism. They are not tied down by any walls, any fixed infra-
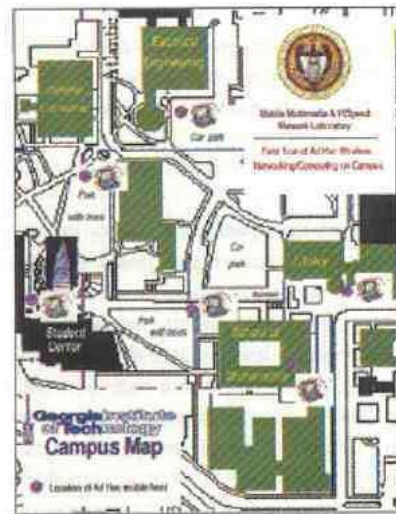
C.K. Toh (inset) and Georgia Tech students experiment on campus (pink dots, top).

structures or any barriers." In fact, Toh believes our world ultimately will be a global network, including a mix of satellite, ad-hoc wireless, cellular data and voice network. "Eventually, it's going to get your data to where you want [it] to go," he says.