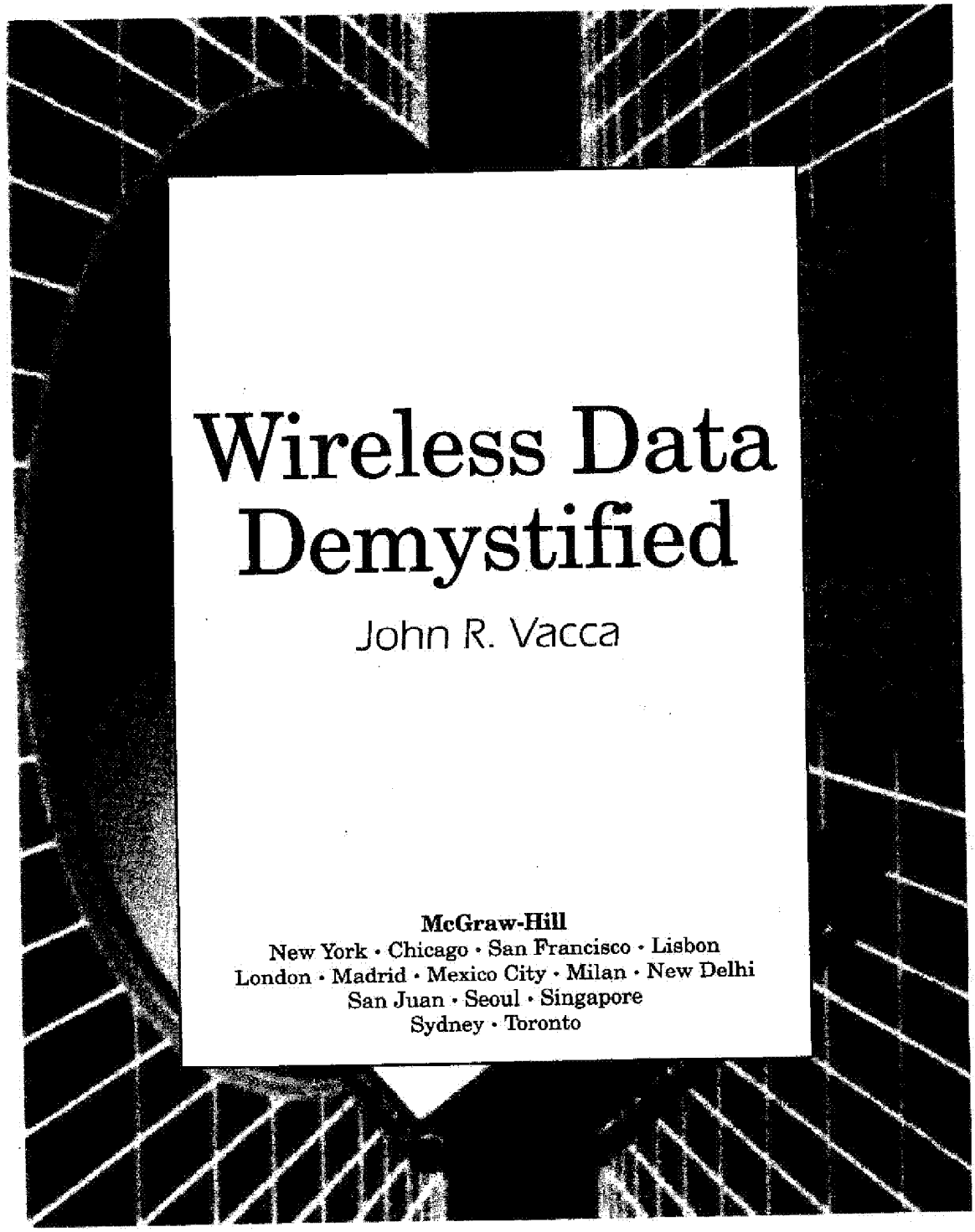
EXHIBIT 8



Wireless Data Demystified

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To Dennis Pleticha, the network guy.

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Most of us use cell phones to keep in touch with friends, colleagues, and contacts, not to buy things. This will likely be the case even when mobile data capability becomes widespread, though the type of communication may change: e-mail (with attachments), database access, and perhaps video or multimedia will supplement basic voice service. As companies have realized this, m-commerce has become a lot less fashionable.

In June 2001, analyst firm Ovum (http://www.ovum.com) asked 60 enterprises in the United Kingdom what they saw as the main application for wireless data. Of the nine available responses, not one enterprise mentioned mobile commerce.

Nearly half chose the ability to retrieve data from corporate networks, and all said they had data that mobile users could benefit from. Some jargon-happy vendors describe this as business-to-employee (B2E) m-commerce, but it's really just remote access.

Nevertheless, mobile commerce isn't dead. Operators are spending billions of dollars on third-generation networks, and they cannot recoup those investments in charges for bits or minutes. They hope to recover their expenditures through more innovative services that take advantage of a cell phone's great distinction—that it accompanies its user nearly everywhere.

Some of these are extensions of existing Web services. They rely on a phone's ability to keep in constant contact with customers, helping them to make time-sensitive decisions. Location-based wireless data technology is something new and unique to the mobile world, permitting genuinely innovative services: for example, a phone that can provide precise traffic and weather forecasts, guide police to a thief whenever it is stolen, and record a person's movements both on line and off line. This last one particularly worries many people, so the industry is emphasizing that location-based wireless data services don't (yet) mean an electronic tag of the kind currently applied only to convicts.

Data aren't stored long-term. Certain services might do this in the future. Parents might have a location-detection device sewed into their kids' backpack or shoes.

Triangulation

All location-based wireless data technologies rely on some variant of triangulation, which means calculating a phone's position by measuring its distance from two or more known points. In the simplest systems, these points are the base stations that sit at the center of every cell. Therefore, all the processing is done by the network, and doesn't require new phones.

Distances are generally measured by using a primitive form of radar: Each base station sends out a radio pulse, timing how long the response

takes. Some systems also try to infer distance from signal degradation: The farther away the phone, the weaker its signal.

Neither method is particularly accurate because radio waves don't always travel directly between two points. They're reflected off walls, trees, and hills, which can make a phone appear to be farther from a base station than it really is.

For increased precision, most systems try to triangulate using at least three sites. The problem with this approach is that not all areas are within range of three different base stations, as networks are usually designed to minimize the overlap between cells. Many remote areas are served by only one, making any kind of triangulation impossible. A single measurement can ascertain how far away a user is from the tower, but not in which direction.

For 20 years, sailors and explorers have known that the most exact way to determine location is through the Global Positioning System (GPS), a constellation of 24 satellites run by the U.S. Air Force. Its weaknesses used to be that terminals cost thousands of dollars, and that the military introduced a random error to frustrate enemy users, which also affected civilian applications.

Both faults have since vanished: The error was switched off in 2000, and GPS receivers are now small and cheap enough to put inside a cell phone.

Only Qualcomm has shipped a GPS phone (it's used in Japan), but all the other major vendors plan to produce them in 2003. They claim that because the receivers only need to pick up the satellite signals, not transmit them back, they can be the same size as regular cell phones—not the bricks usually associated with satellite telephony. Most phones will eventually be equipped with GPS, whether customers want it or not.

GPS works in the same way as ground-based systems that measure time differences, though it's complicated by two factors. First, the satellites are moving, so they continuously transmit their own positions rather than sending simple radio pulses. Second, there's no return path from the receiver back to the satellite. The satellites overcome this by transmitting the precise time, measured by an onboard atomic clock.

A receiver can calculate its distance from each satellite by comparing the received time to its own clock, and then performing triangulation. The receiver needs to lock onto four satellites simultaneously: three to triangulate (because the system is three-dimensional, measuring altitude as well as map coordinates) and one extra to keep its clock synchronized with the network. This results in a location pinpointed to within 5 m (16 ft) and time measurements more accurate than the Earth's rotation.

Assisted GPS

Regular GPS receivers, when first switched on, can take several minutes to find four satellites, which isn't acceptable for location-based