



Making Data Sing: Delivering Data Through FM Radio

By Randolph L. Tom

With so much emphasis on the future of broadband wireless technologies such as WiFi, 3G and 4G, we sometimes neglect the capabilities of existing wireless technologies that are already pervasive. Courtesy of your local FM radio station conglomerate, you are essentially “streaming” information to your car or home stereo from the wireless spectrum. With the market for wireless data services still growing, this is a good time to take a second look at the wireless world we live in.

Nearly 16 years ago I was a founding member of AT&E Corporation, a company formed to use a portion of the FM radio spectrum (called the “FM subcarrier”) to deliver information such as weather, sports and traffic information and small text messages. The initial conduit for this information was a wristwatch, often referred to as a “Dick Tracy Watch.” The proprietary patented chipset that we designed could be embedded into any electronic device: PDAs, computers, microwaves or even refrigerators. AT&E went public with a successful IPO in 1985 and was one of the most innovative and controversial companies of the following decade. With much innovative work by AT&E’s 200 plus engineers and more than \$100 million raised from strategic and institutional investors, we successfully created a nationwide FM subscriber network, while simultaneously creating the world’s first wristwatch receiver. Unfortunately, with the semiconductor technology available at the time, the wristwatch was not small enough to appeal to the then-prevailing consumer demands and styles. Inevitably, like many companies with technologies ahead of their time, AT&E was ultimately sold to one of its foreign partners.

Now, more than a decade later, several major corporations have resuscitated the two key concepts originally developed by AT&E. Earlier this year, Microsoft announced plans to commercialize the DirectBand Network, which will use the FM subcarrier to deliver a variety of surprisingly familiar data (such as short messages, sport scores and stock quotes) to wristwatch terminals. The idea behind both DirectBand and AT&E is to leverage the plentiful and untapped FM spectrum for data. Technology has now advanced to the point where FM data chips can be comfortably and unobtrusively embedded in wristwatches and other devices. For example, your clock radio could automatically set itself and deliver a weather report at the touch of a button. Or your refrigerator could display the specials at the local supermarket with supporting electronic coupons downloaded to your affinity card.

The idea of utilizing a wristwatch as a communications terminal has been pursued by other leading companies as well. NTT DoCoMo, Japan’s largest mobile phone operator, recently introduced “Wristomo,” a mobile phone incorporated into a wristwatch. In addition to providing basic voice service, the Wristomo also offers a wireless Internet connection that provides users with web browsing and e-mail capability.

While AT&E’s “Dick Tracy” wristwatch was an idea that was no doubt ahead of its time, my experience at that company offers a number of valuable lessons for today’s business leaders:

- **Leverage and complement existing technologies**. Before the Internet revolution, the FM sideband technology that AT&E developed was used to enable data, as well as music, to be delivered to a wristwatch receiver wherever located. For more than the past decade, Dynasty has been constantly evaluating new technologies, with many of the most successful ones beginning as a simple tweak on an existing idea. I believe the core issue is that the technology must match the task. For example, a few years ago I was impressed by a product demonstration where a young product engineer showed off the power of the PDA — with a minor enhancement, it could stream audio almost as good as an FM radio, making the overall product that much more attractive. Microsoft's implementation of DirectBand shows that technologies can increase the power of an existing (or even forgotten) medium.
- **Balance strategic alliances**. While AT&E developed and owned the intellectual property incorporated into its wristwatch device, the company did not have the capability to manufacture either the semiconductors embedded into the wristwatches or the wristwatches themselves. The company therefore relied on alliances with foreign strategic partners (Britain's Plessey and Japan's Seiko and Epson) to reduce AT&E's concepts to a functioning product. Ignoring the hardware side of the business due to a lack of manufacturing expertise, we inevitably lost control over the development and manufacturing process. In so doing, we lost the leverage in negotiating further partnerships and other transactions. While strategic alliances are now required in the global economy, I would urge domestic technology companies to work closely with their alliance partners to ensure that they remain intimately involved with the product development and manufacturing process. Given the national security concerns raised by Sen. Joseph Lieberman and others about the threat presented by the export of high-end semiconductor manufacturing, we expect US companies to be increasingly interested in producing the products they invent.
- **Technology patience**. As the Internet revolution proved, for better or worse, the world is always on the lookout for breakthrough technologies that will generate enormous revenues from new, untapped markets. In the vast majority of cases, however, technology takes time to evolve and can only be brought successfully to market when all the necessary elements have been fully developed. In the case of AT&E's wristwatch receiver, chip size and battery life issues prevented the product from catching on when it was originally brought to market in the early 1990's. Now that these obstacles have been overcome, Microsoft and DoCoMo have high expectations about commercializing similar products. Similarly, Apple's Newton PDA was a flop when first introduced because its handwriting recognition software was not sufficiently developed. Following a few years of further development, however, Palm and others were able successfully to introduce PDAs as a mass-market product. The lesson is that a technology, no matter how brilliant, cannot be rushed to market before it is fully developed and the market for it is ready.

While the future success of DirectBand or the Wristomo is by no means guaranteed, I believe that consumers will now enjoy the benefits of real-time information delivery to a watch or PDA. As more media content becomes digitally delivered, the difference between data and entertainment is becoming increasingly blurred. Exploring innovative uses of existing technologies, whether developed by entrepreneurs, academics or government entities, is one promising way to make sure our data can sing and the world joins in.

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