



New Products

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This issue we say farewell to Keith Farkas, who has served as coeditor of this department since its inception in the October–December 2002 issue. At the same time, Maria Ebling is joining the editorial team. Thank you, Keith, and welcome, Maria.

EDITORS' INTRODUCTION

In this issue, we review two products that enhance vehicular transportation: a Bluetooth audio head unit that seamlessly integrates with mobile phones and a system that uses mobile phone network usage data to determine average traffic speeds and areas of congestion. We also report on a laptop and related WiFi technology that significantly lower the barriers to such technologies' use in developing countries and a device that helps soldiers disarm landmines. Please continue to send pointers to upcoming products with exciting possibilities, your feedback on existing products, and your personal experiences with them (your name will be included with your review if you prefer). Email us at pvcproducts@computer.org.

—Eyal de Lara and Keith Farkas

APPLICATIONS

TRACK TRAFFIC USING CELL PHONES

IntelliOne Technologies has developed a system that determines traffic speeds from mobile phone network usage and can report live traffic information for any road with mobile phone coverage.

The IntelliOne system uses Network Measurement Reports originated by handsets. These reports provide the time it takes for signals to travel between the servicing cell and a handset and can be used to locate the handset with 250 m to 500 m accuracy. They also indicate the channel quality between the handset and the serving cell and power levels that the handset measures for neighboring cells. The system processes these Network Measurement Reports to obtain locations with sub-100m accuracy for most handsets; IntelliOne believes that with some enhancements, sub-30m accuracy will eventually be possible most

of the time. The output of this information processing step is a unique ID, a date and time stamp, longitude, and latitude for each handset. Next, on an area-by-area basis, the system filters locations for human or vehicle movement characteristics and maps the vehicle-located phones (that is, traffic probes) to the road network (see figure 1). Finally, it monitors traffic probes for a period of time—generally from two to 20 minutes—and combines this information with information from other probes on road segments to produce average speeds. On roadways with cell coverage, the IntelliOne system's speed estimates are within three to five miles per hour of the averages obtained with GPS data.

To address privacy concerns, IntelliOne receives no identifying information from the mobile phone providers with each data point, but it remains to be seen whether such measures are sufficient to gain public acceptance. Indeed, the article "Enhancing Security and Privacy in Traffic Monitoring Systems" (pp.

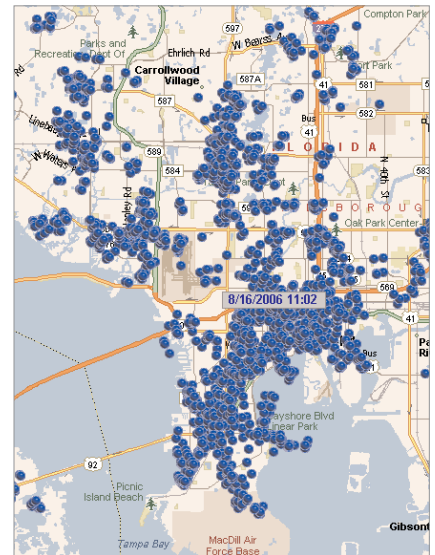


Figure 1. An IntelliOne Technologies system determines traffic speeds from mobile phone network usage and can report live traffic information for any road with mobile phone coverage.

38–46) in this issue discusses how anonymous position information can be used to infer the location of a user's home.

IntelliOne has field-tested the system in Tampa, Florida, and plans to cover the top 30 US markets by the end of 2007 and the top 75 by the end of 2008.

PDA HELPS SOLDIERS DISARM LANDMINES

Canadian soldiers serving in Afghanistan are using a ruggedized PDA developed by Vancouver-based Ngrain to help them defuse and detonate landmines (see figure 2). Soldiers serving in Afghanistan might encounter up to 70 different types of deadly landmines. The R-PDA gives soldiers access to the Canadian Forces Landmine Database, which includes information on landmines found around the world, detailed de-



Figure 2. Ngrain's ruggedized PDA helps soldiers defuse and detonate landmines.

scriptions of their features and appearance, and instructions for disposing of them. Apart from the textual description, the R-PDA provides the soldier with a 3D model of the landmine. Soldiers can view and interact with the simulated landmine on their PDA from different angles and even view its internal components.

DEVICES

\$100 LAPTOP TO UNDERGO BETA DEPLOYMENT

The \$100 laptop, developed by the One Laptop Per Child nonprofit organization headed by Nicholas Negroponte, will undergo its initial beta deployment to 500 Thai children in October and November 2006. OLPC developed the laptop to provide a low-cost computer to poor children in the developing world. It includes a 500-megahertz processor, 500 Mbytes of Flash memory instead of a hard drive, 802.11b/g wireless capability for forming impromptu mesh networks, and a 7.5-inch LCD screen that you can view under the sun, enabling outdoor use (see figure 3). The laptop is specially designed for children. It weighs 1.5 KG, has a rugged handle that makes it easy to carry while walking to and from school, and has a screen hinge that allows folding into "e-book" mode for convenient reading. Finally, to enable

Figure 3. One Laptop Per Child's \$100 laptop will undergo beta deployment in October and November 2006.



operation when electricity isn't available, a foot pump or a hand crank can power the laptop. Nigeria, Brazil, Argentina, and Thailand have each placed orders for 1 million units so far. Additionally, the organization expects that other countries such as India, China, and Egypt will become involved in the project in the future.

SOLAR WI-FI AIMS TO BRING INTERNET TO DEVELOPING NATIONS

Green WiFi aims to bridge the digital divide by providing last-mile Internet access to children in the developing world. A key challenge is that many schools in developing nations lack a reliable electricity source to power a network. To solve this problem, Green WiFi is developing a low-cost solar-powered Wi-Fi grid network solution. Figure 4 shows a Green WiFi prototype assembled using a PVC frame, which is undergoing testing in San Francisco. The prototype uses off-the-shelf hardware and open-source software and integrates support for advanced power management. A Green WiFi access node consists of a Netgear WGT634U Wi-Fi router running Linux, a 10-watt Shell solar panel, a car battery, and open source wireless grid software. Green WiFi nodes can be deployed on rooftops to form a self-healing network that hops the source signal over a virtual 802.11b/g grid.



Figure 4. A Green WiFi prototype assembled using a PVC frame is undergoing testing in San Francisco.

SEAMLESS MOBILE AND CAR AUDIO SYSTEM INTEGRATION

Sony recently introduced a car audio head unit that seamlessly integrates any Bluetooth-enabled mobile phone with the car's audio system, letting you make and receive calls without touching the phone (see figure 5). The MEX-BT5000 implements the Bluetooth headset and hands-free profiles, enabling you to interact with your phone using a microphone integrated with the head unit, the car's audio system speakers, and the head unit's controls. The unit can store up to 50 phone book entries, which it can also display. In addition, you can stream audio to the unit from devices that support the

NEW PRODUCTS



Figure 5. Sony's MEX-BT5000 audio head unit seamlessly integrates any Bluetooth-enabled mobile phone with the car's audio system, letting you make and receive calls without touching the phone.

Bluetooth Advanced Audio Distribution Profile and Audio/Video Remote Control Profile. A2DP enables audio streaming, and AVRCP lets the unit control the playback using features such as play, pause, skip, and fast forward. Although not yet common, phones with support for these profiles (such as the Sony Ericsson W950 Walkman phone) are entering the market. The MEX-BT5000 includes MP3, WMA, ATRAC, and audio CDs codecs, an AM/FM radio receiver, and CD player controls. It's available in the US for approximately US\$400.

ROBOT THAT MOVES ON A BALL

Carnegie Mellon University researchers led by Professor Ralph Holm have developed Ballbot, a battery-operated omnidirectional robot that moves by balancing dynamically on a single urethane-coated metal sphere. Ballbot moves by reading balance information from its internal sensors and activating rollers that mobilize the ball it stands on—in other words, it operates essentially as an inverse trackball. Traditionally, statically stable mobile robots have had bulky bases that prevented them from moving in tight human environments. Ballbot's thin shape and ability to move in any direction without first having to turn lets it maneuver among people and furniture (see figure 6). The researchers' eventual

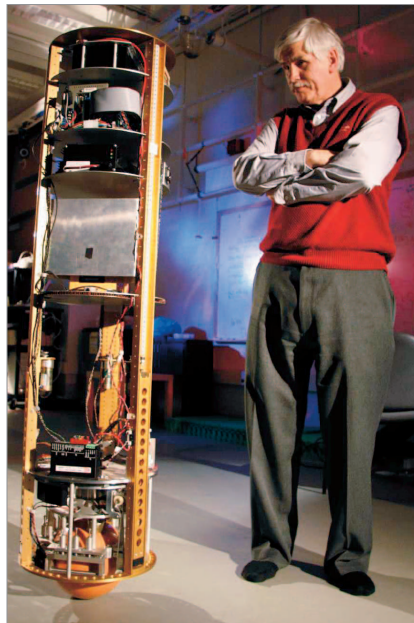


Figure 6. The Ballbot omnidirectional robot can move in any direction without first having to turn.

goal is to produce a robot that's a useful helper to the elderly, the disabled, or people who need assistance in an office environment.

COMPONENTS

TINY SELF-CONTAINED WIRELESS MEMORY CHIP

Hewlett-Packard Labs has developed a 2–4 mm square wireless memory chip, called Memory Spot, that contains a built-in antenna and can store



Figure 7. Hewlett-Packard Labs has developed a 2–4 mm square wireless chip that can store up to several Mbytes of data.

up to several Mbytes of data (see figure 7). You can embed the chips in a sheet of paper or stick them to any surface; they could store short audio or video clips, several images, or many pages of text. A reader-equipped device such as a cell phone or PDA can read the data at 10 Mbytes per second, or the reader could rewrite the data. The chip is completely self-contained; it receives power from the reader through inductive coupling and requires no external electronics. This chip is unique in its combination of size, memory storage capacity, and data-transfer rates, and it enables new applications. For example, you could attach a Memory Spot chip to photographs or postcards to capture commentary, additional pictures, or travel details. You could also attach one to a paper document to record the history of changes you've made to it, voice notes, or the digital original from which you could make copies. HP expects that commercial versions of the chips will be available in a couple of years. ■