Information Technology

This category includes a lot of the latest IT wireless, Personal Digital Assistant, and mobile computing technology. The technologies here streamline the paper documentation process and other construction related tasks.

For more information on this topic, see Design and Internet Tools.

Technology Scanning

One of PATH's major research support services is PATH Technology Scanning. *Technology Scanning* tells us about technology developments in other industries, from other nations, from federal laboratories, and from other building sectors. PATH looks for breakthroughs in other industries that could be transferred and applied to housing. *Technology Scanning*—published by the U.S. Department of Housing and Urban Development/PATH and prepared by the NAHB Research Center, Inc.—are updated as technology developments dictate. The Research Center works to unite technology developers from outside of residential construction with manufacturers in the residential housing sector.

This issue of *Technology Scanning* is one in a series. Each issue in the series falls into one of the following categories:

- *Design and Internet Tools*
- *Safety*
- *Surfaces and Interior Finishes*
- *Building Envelope Technologies*
- *Electrical*
- *Plumbing*
- *Heating, Ventilating and Air Conditioning*
- *Energy/Power Systems Generation*
- *Basic Materials*
- *Information Technology*
- *Sustainable Design Strategies*
- *Materials Recycling and Reuse*
- *Thermal and Moisture Protection*
- *Indoor Environmental Quality*

Call the ToolBase Hotline at 800-898-2842 for information about other available *Technology Scanning* issues. Or, log onto pathnet.org and www.toolbase.org.

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Streamlining the Inspection Function

Mobile Inspection Assistance

This technology, developed by Carnegie Mellon students, employs wearable inspection computers with image capture, voice recognition, pen and voice interface. It is aimed currently at bridge inspectors and surveyors, but once perfected can be configured for almost any construction inspection process to achieve greater speed and accuracy with less manual or subjective intervening.

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Virtual Inspections

At Purdue University they are developing technology using embedded sensors, which leads to smart structures that can be evaluated and inspected remotely. Along with this capability, researchers are developing hybrid, computerized decision support systems for virtual inspections. The system uses digital cameras and optical scanners to acquire data and images to be machine processed. The technology applied to inspections leaves out interpretive judgment, while bringing objective, quantitative, and reliable results.

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Visual Remote Control of Devices

With this technology one could signal and control remote mechanisms with visual information stream — allowing for user-friendly control inputs and simpler, inexpensive means to control remote devices. This method creates icons on the visual scene through which control information is sent and interpreted at the remote site. (Patent issued) (File #095 1) This technology could be applied in a remote inspection process, or for automation of hazardous construction tasks.

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Human-Computer Intelligent Interaction

Cutting-edge research is being done using artificial intelligence, robotics, computer vision, and cognitive science to attempt to duplicate human perception and interpretation. If research continues to be successful, the merger of computing and human skills could open up many applications.

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Adaptive Computing System Capable of Learning and Discovery

This technology bridges the realm of artificial intelligence and computer simulation of natural learning and discovery. It is well suited for repeatable, predictable tasks. (Patent issued) (File #0059)

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Issue 1
November 2001

Logistics Streamlining

Next Generation Bar Coding for Logistics

Tracking and Integration Software from the MIT Research works with the latest in bar code technology to take complex logistics and simplify and streamline them. Born out of research for the defense industry, this latest technology is now being applied to civilian industries. It is available for transfer and is adaptable to almost any logistics process.

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Wireless Tracking Technology

Wave ID will license technology developed at the Pacific NW National Laboratory for the DOD that can track the movement of goods and people. The systems include wireless radio frequency tags ranging in size from a grain of rice to a credit card. The tags are used to identify, locate, and monitor items as they move through a system or complex distribution.

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Efficiently Moving People, Equipment, Materials, Job Tasks

Logistics technology is an enhanced capability to plan, analyze, deploy, and sustain material and personnel flow to multiple points. Components include real time data updates, data reconciliation, data visualization, machine learning, multi-level access and security, integrated applications, simulations, and training and communication. The military is very good at logistics, a definitive factor in the recent Gulf War. The technology they use can be applied or transferred to other industries.

This technology uses a radio frequency identification tag, which is a silicon chip less than 3 millimeters square, embedded in a label, the packaging, or the product itself. It allows readers and computers to track a product as it moves through a factory, through warehouses and distribution centers, into retail establishments, even as its product life is up as it goes to a recycle center. It uses a magnetic field emitted by the reader to power the chip.

In order to communicate, the chip has conductive carbon ink which, when the chip is powered, the antenna coil transmits data from the chip back to the reader. The ultimate goal is to put a radio tag on virtually every manufactured item, each tracked by networks of readers in factories, warehouses, and homes, transforming huge supply chains into intelligent, self-managed entities.

Today bar codes only identify classes of products. This, however, identifies individual products. Bar codes have to be deliberately scanned at specific orientations; radio tags need only be within range of a reader.

The Department of Defense picked up this technology after the huge logistics tasks involved in the Gulf War of moving supplies and equipment to different destinations. The cost of the radio tag was $100 for military applications in extreme conditions. Since then, manufacturers and researchers have modified the tags to satisfy more commercial requirements and the cost is now down around $0.50-$1.00 per tag for short-range chips. The goal of researchers and manufacturers of the tags is to get a penny per tag cost.

Savi Technology, developer of this technology, originally tried marketing this technology to parents to keep track of toddlers in the supermarket. When parents rejected the idea, he found a military application and contracted with DOD after the Gulf War to end wasteful "just in-case" logistics. From that success, they were able to employ technology commercially in specialty industries that ship time sensitive goods. Companies using the system say it has paid for itself many times over: 8 percent gains in productivity, 80 percent drop in incorrect items shipped, 50 percent drop in product shortages, and increases in inventory accuracy to 99.5 percent.

Contact:
Savi Technology
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www.savi.com

Other Companies Manufacturing Radio Tags or EFIDs:
Texas Instruments, Dallas, TX
Motorola, Rolling Meadows, IL
Intermec, Everett, WA
Phillips Semi-conductors, Eindhoven, Netherlands
SCS, San Diego, CA

Military Contact:
CECOM (Army Communication Electronic Command)
Research and Development Engineering
Fort Monmouth, NJ
Phone: 908-532-0353

Mobile Logistics Devices for Common PDAs

Dynasys has developed the latest in data collection attachments for Palm Pilot and Symbol PDAs. They are in use by many warehousing, manufacturing, and logistics companies. These devices allow for mobile collection of data for logistics and tracking purposes. They attach and interface with common Palm and Symbol PDAs and software.

Three areas potentially relating to the construction industry are:

- The Mag Card Swipe attaches to a Palm Pilot and takes data from the magnetic stripe on credit cards, health insurance cards, and information cards. Talking to the technical representative about use for the construction industry, he said it could be to take data onsite from subs and trade workers for time and attendance or hours worked by issuing them pass cards with appropriate information embedded in the magnetic stripe.
- Scan barcodes with portable attachments to Palm Pilots or Symbol PDAs could be used for inventory control, or for tracking of materials into or out of

Conita's PVA enables mobile workers to call from any phone and access crucial information and people through a single, intuitive, voice-driven interface.

Courtesy: Conita Technologies

Courtesy: Savi Technology

Savi's 412 tag is used to track ammunitions in the military.

the site. Product barcodes, which many have now as a result of mass merchants' requests to manufacturers, would be needed on the construction materials.

► Scan 2D symbolgies, PDF, DataMatrix, or Maxicodes could be used in inspection tasks to automate, simplify, and link to electronic plans and documents about the house.

Contact:
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Documentation Streamlining & Task Productivity

Personal Virtual Assistant (PVA)

Conita develops voice-driven, mobile productivity solutions–connecting workers who are on the go with their most critical data and communications–anytime, anywhere. The PVA enables mobile workers to call from any phone and access crucial information and people through a single, intuitive, voice-driven interface. Conita solutions enable mobile workers to stay in-the-know, increase their responsiveness, and recapture time lost in transit and while remote.

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Rugged, Waterproof, Durable, Field- Ready PDAs and Computers

At the Mobile and Field Automation Expo, several companies introduced field-ready rugged devices for computing that withstand the rigors of tough conditions and harsh environments like a construction jobsite. The following are a few examples:

► SideArm All-Terrain Handheld PC- Designed for the Real World— readable display even in bright sunlight, built-in microphone, durable display window and rugged Santoprene case, wireless access to the internet, automated tracking and dispatch systems, and peer-peer communications. It has a 16-hour battery life on a single charge, and has a water-sealed design.

Contact:
Melard Technologies
Armonk, NY
Phone: 914-273-4488
www.melard.com

► TouchLite Handheld PC- tough, rugged design with a large carry handle, touch screen commands, and Windows CE platform. It has an easy, no keypad use with a large display screen.

Contact:
Two Technologies, Inc.
Horsham, PA
Phone: 215-441-5305
www.2T.com

► GETAC Notebook PC- has water- and dust- tight magnesium cases, Intel PII or III chips, and touch screen and sunlight options. They are shock proof, vibration proof, wireless, and built to survive.

► GETAC Tablet PCs – have launched three new models: CA35, CA25, and PC700/702 series. All of these have rugged, durable, magnesium outer shells and screens, and are tested to 3 foot drop heights. They are either pen activated or touch screens.

Contact:
GETAC, Inc.
Irvine, CA
Phone: 949-699-2888
www.getacusa.com

► Symbol Technologies and ViryaNet Mobile Software- tough, rugged, mobile PDAs can be configured to fit a company's internal network so that the field force has the same connection to the company as the desktop users in the company. Some models are available as PDA and phone. These are used heavily for field service functions in locating and dispatching field service people, ensuring they arrive on time, and with the right parts to meet the service obligation. Information can be transmitted back to the company on call completion, parts used, detailed expenses and notes–all in real time at the close of the service call. This system could be applied in construction not only in service calls but also in up-front construction with subs and trade groups who come on the jobsite to perform tasks or to bring parts.

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www.viryanet.com
or
Symbol Technologies
Holtzville, NY
Phone: 631-738-2400
www.symbol.com

Courtesy: Symbol Technologies' SPT 1700

Ruggedized, mobile-wireless devices use ViryaNet to connect field engineers and on site managers to remote services and corporate data.

Documentation Streamlining and Task Productivity, continued

E-phone Does it All

The PC-ephone (CYBird) is a wireless personal digital assistant with full internet, PC, cell phone, and organization capabilities. This mobile phone and PDA/PC runs on Microsoft's CE operating system. The bluetooth wireless technology features a handset that is adaptable up to 30 feet away from the main unit. The cost is estimated between $1500-$1700. This device dispenses the notion of three separate devices: PDA, cell phone, and computer. They are waiting for FCC approval for release of the product.

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E-paper

Electronic paper, developed by 3M and Xerox, is thin and flexible. It is made with a thin layer of tiny round beads sandwiched inside the paper to display images. The beads are black on one side and white on the other. Specialized electronic devices signal the paper to flip certain beads to form the desired image. E-paper is portable and updateable. Single sheets can be used for many images. Potential applications in housing include blueprints or construction documents, especially where lots of changes are occurring.

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www.parc.xerox.com/dhl/projects/gyricon
www.sciam.com/2001/1101issue/1101ditlea.html

Courtesy: Xerox

SmartPaper being unrolled.

Courtesy: Deanna Horvath, Xerox PARC photographer

SmartPaper MaestroSigns, prototypes of the ones Macy's installed for a pilot at their Bridgewater, New Jersey store.

Procurement & Labor Streamlining

A host of website companies offering procurement services continues to expand and decline as some come in and others exit. They include some of the following:

- BuildFind.com–the building industry hub, Buildfind includes AECjobbank.com, Building.com, Remodelonline.com, Contractorlocate.com, Builderscentral.com;
- Buzzsaw.com–online collaboration and procurement;
- One Build.com–leading e-market enabler and supply chain provider for construction materials;
- ProcureZone.com–specification library and tools for automating procurement of engineered equipment and materials;
- BuildZone.net–building industry portal with special focus on Indian construction industry;
- RealLabor.com–labor management software to track and manage daily labor;
- EngineerSupply.com–online purchasing of architectural, engineering, and construction supplies;
- Construction.com–access to the construction marketplace through Dodge, Sweets, ENR, ARCHITECTURAL RECORD, and various state construction sites; and
- Projectalk.com–an internet based community where you use project management tools without updating or maintaining them or worrying about security. Employees or users get unique access codes.