IT Insight by Jill Barson Gilbert

The station used to test blended biomass fuels and study combustion conditions at EPA’s Multipollutant Control Research Facility in RTP, NC.

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Grand Finale

Noteworthy Information Technologies of the Past 16 Years

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Solidly into the 21st Century, my typical day goes something like this… I check my email and social networks on my iPad at the breakfast table. I check text messages and voicemails on my smartphone. Then I go to the office, where I log on to my notebook computer and have a video Webcast—all without leaving the house. On my way to a business appointment, I connect my iPhone to the car via Bluetooth to take French lessons or listen to hundreds of digital songs. Alternately, I listen to satellite radio or digital HD radio (I don’t recall if my car has a CD slot). When I come home for the evening, I sit in the recliner and check emails and social networks again. Then I watch network TV shows, access video on demand through my smart TV. While we take these technologies for granted, many are fairly recent. This column takes a quick look at some of the more significant technologies since IT Insight first appeared in February 2001.

Computers and Operating Systems

Desktops and Laptops

When I started this column 16 years ago, we “knowledge workers” used desktop or laptop computers on Windows NT; businesses largely ignored Windows 2000 and Windows Millennium Edition (ME) and waited until Windows XP became available in late 2001. This was Microsoft’s most popular operating system ever, and many businesses continued to use XP after Microsoft stopped supporting it more than 12 years later.

Today, my “go to” laptop is a MacBook Pro, and my backup is a Windows 10 touchscreen laptop. Web-enabled apps and the ability to create files in universally readable formats provide EH&S managers and other knowledge workers a wide choice of computers and operating systems. Of course, choice opens a Pandora’s Box, with IT departments challenged to support and ensure security of a variety of company-issued and personal devices and networks.

Data Storage

Software today is more complex than it was 16 years ago, resulting in larger data files and an exponential increase in the amount of data stored. Fortunately, data storage technology has kept pace, and today we have a choice of storage methods. My first PC had a whopping 20 MB of disk space (yes, you read that correctly); today, my MacBook Pro and Lenovo laptop have 512 GB each.

While many laptops still have hard disk drives with moving parts, the trend is toward solid state drives, with no moving parts, faster access to data, and less heat produced. Many large enterprises still use servers and magnetic tape backup, and many others use Cloud storage and backup.

Smartphones and Tablets

It is hard to believe that smartphones became commercially available only 10 years ago. Before then, “feature phones”—some with QWERTY keyboards—and Blackberrys were standard for business and personal use.

Tablets are even newer, with the iPad’s debut in 2010. Their slim profile, light weight, and long battery life make tablets a go-to tool for emails, social networking, and Web browsing. While tablets have taken the business world by storm, most still lack the ability to truly replace a full-featured laptop.

Connectivity and Communications

The most significant advances in this area include wireless technologies, namely Wi-Fi and Bluetooth, that enable mobility, and standardized data and power technologies such as USB, Lightning, and Thunderbolt.

Wi-Fi

In 2001, a local area network usually meant a hard-wired Ethernet with colorful cables that connected each computer to more cables in the office walls and ceiling, which connected to a computer server. This required us to be in the office, unless we traveled to a remote site, when we might be able to dial in using a telephone connection.

In 2017, wireless networks are the norm. Wi-Fi technology replaces high-speed cabling with radio frequency (RF) signals, connecting devices within 20 m (66 ft). Where many Wi-Fi networks have security measures like passwords, both business and personal networks can be vulnerable to attack—think about the last time your business changed its Wi-Fi password.

Bluetooth

Bluetooth is another RF technology, connecting devices within a few feet. It enables mobility by pairing devices like smartphones or laptops wirelessly with headphones or speakers. Developed by Ericsson in Sweden, this technology is named for Harald Bluetooth, a 10th Century Danish King who united warring factions in what are today Denmark, Norway, and Sweden. The Bluetooth logo combines Old Danish runes for “H” and “B.”

USB, Lightning, and Thunderbolt

Not too long ago, each input and output device—mice, keyboards, displays, and printers—had its own, proprietary cable. The Universal Serial Bus (USB) set the new standard for cables; USB 2.0 for high-speed connections in 2001, and USB 3.0 for super-speed connections in 2008. Standard, micro- and mini-USB cables allow connection with devices like smartphones and cameras that require a smaller data transfer port.

Apple developed the Lightning connector, a small computer bus and power connector, in 2012. This new, 8-pin connector is tiny, compared to the 30-pin dock connector it replaced, and can be inserted face up or face down. Apple and Intel developed the Thunderbolt connector, used to connect peripherals to a computer. Versions 1 and 2 used a mini display port connector; version 3 uses an interchangeable USB Type-C connector. Thunderbolt is a serial connector that also supplies DC power.

The Internet

What would we do without the Internet, a massive network of networks, an infrastructure that connects millions of computers? The Internet provides the framework for the World Wide Web
(or Web), an information-sharing model. Inventor Tim Berners-Lee was honored in April 2017 with the $1-million Turing Award for his work inventing the Web.

The Internet also enables several business-critical and social technologies:

- Cloud computing
- Cloud data storage
- Social networks
- Media streaming

Cloud Computing
Cloud computing uses a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. In medium and large enterprises, Cloud computing services provided by Amazon, Microsoft, IBM, Oracle, and others displaces the older client—server software model.

Cloud Data Storage
Online data storage in the Cloud (Internet) allows data to be stored in and accessed from multiple distributed and connected resources. Major Web services providers above also provide data storage for enterprises; Dropbox, Google Drive, Microsoft OneDrive, and iCloud offer personal Cloud storage solutions.

Social Networks
Social networks represent relationships and flows among people, groups, organizations, computers or other information/knowledge processing entities. Facebook, Twitter, and LinkedIn are common marketing tools, allowing businesses to reach new audiences.

Media Streaming
Imagine holding your entire record and movie collection in your hand… you can, with media streaming. Faster Internet speeds and high-powered laptops, tablets, and smartphones have enabled streaming to displace vinyl records, magnetic tapes, CDs, DVDs, and Blue-Ray discs. Data transfers as a steady and continuous stream, and all the user needs is a device to receive and display the information, whether it be music, video, or podcast. Streaming services like Amazon Video, Apple Music, Spotify, Hulu, and Netflix charge a monthly subscription fee; YouTube and Pandora offer free online streaming.

Looking Ahead
We will continue to use information technologies to add business value, though we do not know how we will manage or consume information technologies 5, 10, or 20 years from now. All we know is that it will be different.

Here are a few things I would like to see:

- A better relationship between users and technology, resulting in EH&S software that is easier to implement and easier to adopt;
- Improvements in IT security, including the death of passwords;
- More “heads up,” face-to-face social interaction; less “heads down” interaction with smartphones; and
- IT laws and ethics catching up with technology.

Closing
In 2000, I pitched an idea for IT Insight to the EM editorial staff. The column would help bridge the worlds of environment, health, and safety (EH&S) and information technology (IT), addressing emerging technologies and their applicability to the EH&S market, for instance:

- how EH&S vendors use emerging technologies in their products and services;
- how end users leverage new technology and EH&S applications;
- the benefits of data integration between and among systems; and
- the business benefits of IT.

I trust that my columns stayed close to this charter, and that it has been as interesting for you to read as it has been for me to research and write. Thanks for reading IT Insight! em