New Tech at CEATEC: A Look at Merging Technologies

By William Lumpkins

As the IEEE Consumer Electronics Society Standards Committee chair and as an associate editor of *IEEE Consumer Electronics Magazine,* I had the honor of attending the Combined Exhibition of Advanced Technologies (CEATEC) in Chiba, Japan, which took place 1–5 October 2013. The following is an overview of the some of the highlights that impressed me at the conference.

A major theme for this year was electric vehicles and the smart city. Figure 1(a) shows an example of the HAMO vehicle system. With the HAMO (a Toyota initiative), a user activates her near-field communication (NFC) or radio frequency identification device (RFID)-enabled phone to check out the vehicle [Figure 1(b)], which is plugged in to an electrical recharging system. The user then enters the vehicle (Figure 2), either entering her destination on a touch panel or using her phone to send the destination information to the vehicle. The HAMO vehicle then connects to the HAMO cloud computing servers (Figure 3) to find the most optimal route through the countryside or city to reach the destination. The HAMO cloud computing servers monitor weather conditions, other vehicle traffic, and potential traffic hazards, ensuring that the HAMO vehicle traveler has the safest and most direct route to her destination. Upon reaching her destination or after touring the countryside, the HAMO vehicle is dropped off at a HAMO vehicle recharging station; the user checks in the vehicle with her smartphone (NFC/RFID) (Figure 4). The individual is charged for just the time/distance of the vehicle use, generally fewer than US$0.50 per mile.

(a) (b)

FIGURE 1. (a) A user activates the HAMO rental application on her smartphone. (b) A user swipes her NFC phone on HAMO to check out the vehicle. (Photos courtesy of O & S Services.)

In addition to the electric vehicle management systems, wireless recharging systems were also featured. In this case, I do not mean 802.11 or Qi (pronounced "Chee") is an interface standard developed by the Wireless Power Consortium for inductive electrical power transfer over distances of up to 4 cm (1.6 in). (The Qi system comprises a power transmission pad and a compatible receiver in a portable device. To use the system, the mobile device is placed on top of the power transmission pad,

FIGURE 2. A user enters the vehicle. (Photo courtesy of O & S Services.)

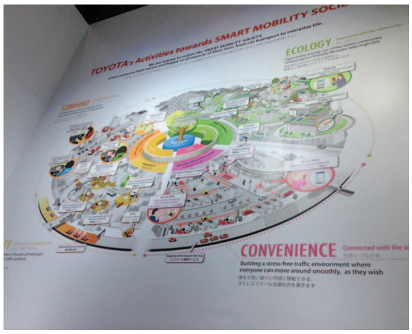

FIGURE 3. The HAMO cloud computing servers and smart city concept. (Photo courtesy of O & S Services.)

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FIGURE 4. A user prepares to check in the vehicle with the NFC in her phone. (Photo courtesy of O & S Services Inc.)

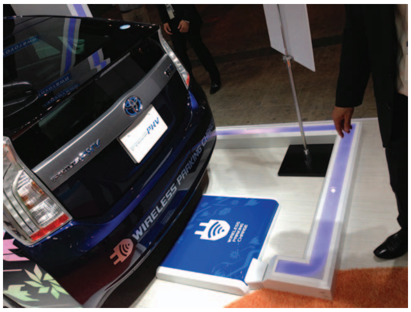

FIGURE 5. The Toyota magnetic resonance wireless charging system. (Photo courtesy of O & S Services Inc.)

FIGURE 6. A Toyota executive with the company's wireless park-and-charge system. (Photo courtesy of O & S Services Inc.)

which charges it.) Figure 5 shows an example of magnetic resonance charging, where the vehicle moves over or parks in a space that has a magnetic resonance charger in place. With no direct interaction with the user, the properly equipped vehicle can begin recharging while the owner is shopping, at home, or in the office. There is no need to worry about plugging in or unplugging the vehicle. Text messages can be sent from the charging station to the user to tell him/her the progress of the charging or

FIGURE 7. The TDK concept magnetic resonance system. (Photo Courtesy of O & S Services Inc.)

FIGURE 8. Pascal Forget showing off NTT Docomo Inc.'s Prototype AR glasses. (Photo courtesy of O & S Services Inc.)

FIGURE 9. My experience in trying out the AR glasses. (Photo courtesy of O & S Services Inc.)

when the charging is complete. This extends the usability of electric vehicles beyond the nice-have to the efficiently useful state (Figures 6 and 7).

Another interesting theme is augmented viewing, known in the United States as Google Glass or augmented reality (AR); it seemed like every major Japanese company was showing off its vision of this product. Figure 8 shows a famous French television journalist, Pascal Forget of the popular television show, *Les Nerdz* (www.lesnerdz.com), testing out the prototype AR glasses of NTT Docomo Inc.

In Figure 9, Forget attempts to catch an elusive animi (Teddy Bear) creature in the air in front of the AR glasses that I am wearing. NTT Docomo Inc. (a leading provider of cell phones in the Japanese marketplace) also showed off their AR glasses and "finger rings." The NTT Docomo Inc. solution uses infrared (IR) sensors and special lenses to depict a three-dimensional (3-D) image in the air in front of the user, depending on where the user turns her head and or moves her fingers dictates how the image is manipulated in front of the user in the visual space. The glasses do not require any power source; the host system transmits IR waves, the special tipped points on the glasses, and finger rings (bounce back, like a Doppler shift-based radar) report back to the host system with their relative location, and the host computer modifies the 3-D image that the user sees with specially treated glasses.

Users who are not wearing the glasses see no projection unless an external monitor is set up for a two-dimensional display. Multiple users can interact with the system, but it does require a lot of processing power for the host system. This is very different from traditional AR glasses in which the display processing is in the glasses themselves, but these glasses are required to have a constant power source. I can see the NTT Docomo Inc. approach being widely adopted in a

FIGURE 10. The NTT Docomo Inc. AR glasses and finger rings.

FIGURE 11. An NTT Docomo Inc. hostess showing off NTT Docomo Inc.'s famous mushroom character.

heavy research environment, where a powerful host processor or cloud computing component exists with the special IR camera system that does not require the host system to leave the laboratory or research environment (Figure 10). In Figure 11, the NTT Docomo Inc. hostess displays the trademark NTT Docomo figurine. Many

FIGURE 12. A 4K television. (Photo courtesy of O & S Services.)

Japanese companies use cute figurines or dolls to represent their company to attract young ladies and children.

Another dominant topic at the show was "4K" televisions. As you all know, 4K refers to televisions with 4,000-pixel resolution in one of the coordinates, e.g., 4,096 × 2,560, which is called 4K ultra-high definition (UHD). The industry can be a bit flexible with the absolute value, e.g., 4K UHD also has a possible resolution of 3,840 pixels × 2,160 lines (8.3 mp, aspect ratio 16:9); there are many variants as well. Figure 12 shows one of the various 4K 70-in televisions models now available. This unit costs between US$6,999 and US$4,999 depending on where you shop.

The CEATEC show was a lot of fun, and it was great to see so many insightful examples of Japanese merging western and eastern technologies into innovative products. It also allowed us some foresight into the famous western trade show held in Las Vegas every year, the Consumer Electronics Association's Consumer Electronics Show. As always, I look forward to your feedback and ideas of other topics for our magazine to cover. Feel free to reach me at xillia@ieee.org

Standards *(continued from page 58)*

- **PC37.98/Draft D5.1E** (PE/PSR): *Standard for Seismic Qualification Testing of Protective Relays and Auxiliaries for Nuclear Facilities*
- **PC37.122.6/Draft 9** (PE/SUB): *Recommended Practice for the Interface of New Gas-Insulated Equipment in Existing Gas-Insulated Substations Rated Above 52 kV*
- **PC57.96/Draft 6.3** (PE/TR): *Guide for Loading Dry-Type Distribution and Power Transformers*
- **PC57.134/Draft 2.1** (PE/TR): *Guide for Determination of Hottest-Spot Temperature in Dry-Type Transformers.*

Of all the standards approved in 2013, of course, the dearest to our hearts is IEEE 1874/Draft D0.2 *Standard for Documentation Schema for Repair and Assembly of Electronic Devices*. This is the IEEE Consumer Electronics (CE) Society's first standard in over 50 years. We are proud of the 1874 working group and the CE Standards Committee's dedication in getting this standard "out the door"; normally, it takes a working group between two and three years to finish a standard. IEEE 1874 was completed within one year, a new record for IEEE. We had help from plenty of people including Kyle Wiens, Timothy Asp, Mark Schaffer, Daniel Beardsley, Daniel Eisenman, Robert Sanitate, Cornelius Van Rensburg, Nathan Nossal, Daniel Wiens, and myself.

As I am sure you all remember, IEEE 1874 (also called "The O Manual specification") is an XML-based package format for distributing procedural manuals. A manual can describe a collection of procedures or just a single procedure. This specification describes the O Manual bundle file format (a collection of structured files), a file manifest XML format, a topic XML format, and a procedure XML format; the specification may be expanded in the future to enable additional types of documents [1].

The purpose of IEEE 1874 is to provide the structure for repair manuals so that they have the same look and feel across multiple platforms, like tablets/slates or portable viewing devices. The hope is that by allowing the spread of repair manuals, it will enable consumers to extend the product life cycles of their purchased products, thus reducing unnecessary waste and unneeded electronic trash cluttering up our planet. The IEEE 1874 team is now in the promotion phase of the life of standard, meaning we are trying to get the word out near and far and getting as many companies as possible to adopt its use. We will also be working on a new set of standards within IEEE 1874 for design for reparability and reuse as well as other "green friendly" orientated concepts to help in this regard.

As always, if you would care to reach me or help in our endeavors, please contact me at xillia@ieee.org.

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[2] W. Lumpkins, "The formation of the P1874 'O Manual' Working Group," *IEEE Consumer Electron. Mag.*, vol. 2, no. 1, pp. 52–54, Jan. 2013.