CES 2020: Automotive And Health Fields Drive Much Tech Development

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With more than 4000 companies exhibiting and over 170,000 attendees participating in the recently held CES 2020, the world's largest technology show can be difficult to describe. Hosted by the Consumer Technology Association, and once referred to as the Consumer Electronics Show, this is a tech show that showcases all tech products for humans. This includes those tech products we wear, those that entertain, inform, guide or connect us; those that make us healthier, happier, smarter or safer; and those that transport us. With the word consumer attached to the show, we might think these products are just for personal use, at home or in our daily travels. But there are products at CES relating to nearly all imaginable aspects of daily life including products for the office, factory or other work settings.

From a power electronics perspective, CES is a bellwether of the applications that will influence power semiconductor and power supply development now and in the future. As I toured the exhibit halls in the Tech West and Tech East venues at CES 2020 last week, I observed that automotive and health stood out as dominant themes in the exhibition. While the exhibition is certainly much wider in scope, as suggested above, there were just so many exhibits with so many new products relating to automotive (or "mobility" to use the even broader category) and health/fitness, that these segments of CES could easily stand on their own as major exhibitions.

Drilling down a bit, LiDAR seemed to have grown as a product category at CES with more LiDAR exhibitors than in recent years. Similarly, wireless charging looked like a category that has grown in terms of the number of exhibitors and/or products shown. Finally, at CES 2020, it was hard to avoid that batteries are almost everywhere, whether they're being charged with or without wires. While that seems like a given in the portable, consumer space, touring the halls at CES 2020 left me with impression that the battery trend is much broader than that.

A Range Of Products, Services And Organizations

While most of the products seen in the exhibition are end use products, either hardware or software (increasingly these are apps), there are also numerous products in the exhibition that are components, materials, instruments, software, services, and various other enabling technologies to support the development of the various end products showcased at CES. Many industry organizations are also here. Perhaps the one unifying theme is technical innovation, but the show is also a testament to entrepreneurship and the global tech marketplace.

While larger brand name companies may dominate in the halls devoted to automotive, entertainment, connectivity and the home, the section in the Sands Expo known as Eureka Park is CES' showcase for startups. At this year's CES, there were over 1200 of them, coming from 50 countries, many clustered in country-specific pavilions that help drive home the message that this is truly an international event. (Show demographics will do that in general. As the CES 2020 show guide noted, attendees at this year's show hailed from 160 countries.) While it mainly showcased startup companies, there were also many university exhibits within Eureka Park.

In addition to the companies with booths big and small in the exhibition halls, there are numerous supplier companies off the show floor in conference rooms and hotel suites where they hold meetings and show their product demos to customers, press and other interested parties. With such a wide range of organizations, products, technologies and innovations on display at CES, Karen Chupka, Executive VP of CES, probably captured the spirit of the event best in writing "CES is the place to see the unexpected."

Specific Product Categories

So what were the products or technologies that stood out at this year's show? The CES website lists 36 product categories that were represented at CES 2020. For those who have attended in recent years, or read reports on the show, many of these categories will sound familiar including 3D printing, AI, drones, fitness, robotics, gaming, VR and AR, smart home, smart cities and self-driving vehicles. The printed program (page 6) also noted some cross category tech trends at CES such as 5G, Block Chain and Data and Analytics. Although not called out there, IoT certainly received attention too.
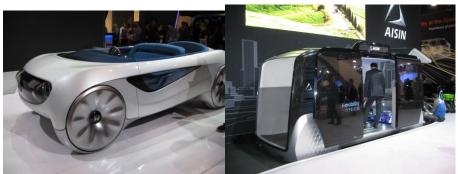
Product Categories

- 3D Printing
- Accessibility
- Advertising, Marketing, Content and Entertainment
- Artificial Intelligence
- Audio/High-End/High Performance
- Cloud Services
- Computer Hardware
- Cyber Security and Privacy
- Digital Health
- Digital Imaging/Photography
- Drones
- Education
- Entertainment & Content
- Fitness
- Gaming
- Lifestyle (Family, Beauty, Pet)
- Mobile Payments/Digital Finance/E-Commerce
- Public Policy/Government

- Resilience
- Robotics
- Sensors and Biometrics
- Self-driving vehicles
- Smart Cities
- Smart Home
- Software and Apps
- Sports Technology and Esports
- Sustainability
- Telecommunications
- Travel and Leisure
- Vehicle Technology
- Video
- Virtual Reality and Augmented Reality
- Wearables
- Wireless Devices
- Wireless Services
- Other Consumer Technology

In terms of new topics, for the first time, a section of the exhibition at the Las Vegas Convention Center (part of the Tech East venue) was devoted to Travel and Tourism. In keeping with this theme, Delta Airlines had a large exhibit where they showed an exoskeleton intended to help their employees with lifting of both luggage and airplane parts. Meanwhile, Delta's CEO, Ed Bastian, delivered a keynote on Tuesday where he discussed how the company is using technology to improve the travel experience and their plans to make their Fly Delta app, "your digital travel concierge".

However, for me the two broad themes that stood out at CES 2020 were automotive/mobility and health. Both represent topics that have been well represented in recent years. However, it seemed to me these two areas received even more attention at this year's show. By mobility, I am mainly referring to the many automotive related exhibits in the LVCC's North Hall. Here we see concept cars from the car companies, mostly showcasing autonomous driving and ADAS (advanced driver assistance systems), plus the various automotive suppliers.

But these vehicles weren't limited to passenger vehicles, there were various types of human transport and work vehicles such as tractors from John Deere, another Bell hellicopter, and even a yacht (smaller than the one shown last year). Mobility also includes the various e-bikes and scooters, which were shown in various parts of the exhibition. A section on Smart Cities, was heavily automotive in nature with products and technologies to support autonomous driving—EV charging stations including some very high power fast chargers stood out here.

The Honda concept car, i-mobility transport from Aisin, and Bertrandt car were displayed alongside more conventional looking vehicles like the Ford Mustang and work vehicles like the Bobcat and Autonomous Wheel Loader.

EV charging stations from EVBox, BTCPower and Chrevi. A number of companies are making very high power (hundreds of kilowatts) fast chargers.

Many Electric Vehicles And LiDAR Products

Naturally, the EVs are a big application for power electronics with the car. Much of the semiconductor industry is busy developing new power semiconductors, modules and reference designs for traction inverters, dc-dc converters and on-board chargers, often using SiC devices but with some early GaN-based developments. However, one of the areas that's considered a major application for GaN is LiDAR, and the number of companies exhibiting LiDAR products seemed to multiply this year. LiDAR systems and products seemed to appear everywhere in the exhibition.

LiDAR displays from Quanergy, Veloydyne and Benewake were just a few of many and offered examples of various applications for this sensing technology.

Meanwhile in the Sands Expo (part of Tech West), the show's focus on health stood out in the main exhibit halls (A-D), which signage designated as "Digital Money, Family Technology, Fitness, Health & Wellness and Wearables". The emphasis on health was also apparent in Eureka Park, the start up expo. According to the Show Daily (January 8 edition), CES 2020 saw "explosive growth in the number of "health/wellness" exhibitors—nearly 400 at the Sands and in Eureka Park Health & Wellness section—[which was] 25% more than last year."

This category not only includes personal health and fitness products such as more sophisticated wearables and apps, but also more professional items such as a portable MRI from Hyperfine, and a fetal monitor to detect a baby's distress. All aspects of health and wellness seemed to be addressed in one fashion or another. There were even products to promote sexual health (two of these received CES Innovation Awards).

A portable MRI from Hyperfine and an "Operating room of the future concept" exhibited by AT&T business.

Wireless Charging—Hardly Standard

Beyond the growing presence of automotive and healthcare products, I noticed a general growth in wireless charging products including many using the standard protocols (Xi and Air Fuel) but also proprietary systems, mainly RF, but in one case, infrared.

But even bigger than wireless charging, is the general proliferation of battery-powered products at CES. Increasingly, these batteries cover a growing range of applications from small consumer products to EVs and portable, battery-based sources that are intended to supplant diesel generators. This takes the familiar concept of the battery bank for recharging our portables (smart phones and laptops) to the level of residential backup power source.

While CES continues to feature cell and battery pack suppliers in the exhibition, the continued growth of battery-powered products points the way for continued development of more sophisticated and application-specific battery management ICs. For those interested in entertainment, CES continues to show the latest in display technology, video, audio and gaming. But one of the items that caught my eye were the wireless ear buds—they were seemingly everywhere and they too represent yet another application for wireless charging.

A floating solar energy-charged battery shown by Voltaic and GoalZero's battery power source. Signage introducing the latter proclaimed "Goodbye Gas Generator".

With these product trends in mind, it is easier to understand why the power semiconductor companies target their IC developments in some of the areas named in this article. In a subsequent article, I will discuss some of the semiconductor components and reference designs I saw demo'd at CES 2020.