CES Show Offers a Peak into the Future

Artificial intelligence, a wealth of wearables, and smart, connected everything dominated the massive consumer technology event

By Robert Grace

The 2020 edition of CES, the sprawling consumer electronics trade show that takes over Las Vegas early each January, was again a showcase of futuristic concepts, connected technology, artificial intelligence, advanced (and sometime cute) robotics, autonomous mobility, 5G fervor, and smart devices—from the ingenious to the ridiculous. This year even featured, for the first time, a tasteful section devoted to "sex tech," or pleasure appliances, if you will.

Gary Shapiro, head of the Consumer Technology Association, helped open the huge CES 2020 show with a forecast of key trends and hot products. Courtesy of CES®

Spread across multiple venues in the city, CES attracts more than 175,000 attendees, some 4,500 exhibiting companies, and featured more than 1,000 speakers—from artists and musicians, to Hollywood moguls, global CEOs and U.S. government officials. Exhibitors ranged from multinational giants to small, innovative startups seeking funding via Kickstarter campaigns.

The event's organizer, the Consumer Technology Association, addressed the media prior to the show's opening, offering the latest projections from its twice-yearly "U.S. Consumer Technology Sales and Forecasts" report.

Gary Shapiro, CTA's president and chief executive officer, said, "More and more consumers are embracing the faster connectivity, advanced intelligence and seemingly infinite content that technology offers today—pushing consumer technology industry revenues toward another record-setting year in 2020."

Key Trends and Hot Products

The association forecasts, for instance, that the digital health category in the U.S. will sell 64 million devices this year, totaling $10 billion dollars. This covers everything from smartwatches, fitness trackers, and connected health-monitoring devices such as blood pressure monitors and smart scales.

The high-growth emerging categories highlighted by CTA include:

» Wireless earbuds: Devices such as Apple AirPods and Samsung Galaxy Buds will help propel the category in 2020 to nearly 67 million units in 2020 (up 35 percent), earning $8.2 billion in revenue (up 31 percent), after a breakaway year of sales in 2019.

» Smart home: Safety is a key driving force in the smart home category. CTA expects smart home sales—including smart doorbells and locks, wi-fi cameras, smart thermostats, smart smoke and carbon monoxide detectors, and smart home security kits—to reach 35.2 million units (15 percent growth) and $4.3 billion (up 4 percent).

» Smart speakers: Consumers are upgrading their smart speakers, such as Google Home, Amazon Echo, or Apple HomePod, to voice-enabled devices with a display screen. Unit sales are projected to reach 39 million units sold (up 5 percent over last year) and $4.2 billion in revenue (14 percent increase) in 2020.

"The last decade was about the Internet of Things—but now, we kick off a new decade defined by the Intelligence of Things," according to Steve Koenig, CTA's vice president of market research. "Over the next 10 years, the dynamic of connected intelligence will grow apace with advancing 5G networks and innovative applications of AI to propel the consumer tech industry forward—and with it, consumer experiences, safety, health, and more."

Laptops maintained their lead as the most popular personal computing device, with some 53 million laptops expected to ship in 2020 (up 1 percent). Television manufacturers are projected to ship 40.8 million units in the U.S. this year (a 2 percent increase). Replacement upgrades will be driven by bigger screens and TVs featuring 4K ultra high definition (4K UHD) resolution and high dynamic range (HDR).

And in-vehicle tech will continue to grow, CTA said. It sees factory-installed in-vehicle technology growing by 6 percent to $18.5 billion in revenue in 2020 "as autonomous safety and entertainment features in new car models pave the way toward more revenue growth. More manufacturers are including advanced driver-assistance systems (ADAS) features such as automatic emergency braking systems, active lane keeping, and more."

A Major Automotive Forum

Having grown well beyond being a show focused on smartphones, awesome speakers, cool TVs, nifty robots, and next-gen appliances, CES has become one of the largest automotive shows in the country, attracting senior executives from automakers and key suppliers worldwide. But don't expect them simply to show the next models of their cars.

» Toyota Motor Corp. President Akio Toyoda announced plans to build an entire prototype town, called Woven City, on 175 acres near Mt. Fuji in Japan in 2021, with the aim of creating a controlled environment to serve as a test bed for emerging technologies (see sidebar).

» South Korean automaker Hyundai Motor Co. unveiled plans to build an electric Vertical Take-Off and Landing (eVTOL) tilt rotor aircraft to serve as air taxis for a planned Uber passenger service called Uber Elevate. Though the aircraft is not due to be ready before 2029, Hyundai displayed a full-scale model hovering over its booth at the Las Vegas Convention Center (see sidebar).

California EV maker Fisker Inc. showcased its Fisker Ocean luxury SUV, which it calls "the world's most sustainable vehicle." Courtesy of CES®

» California-based electric vehicle (EV) maker Fisker Inc. rolled out the Fisker Ocean, an all-electric luxury SUV, humbly calling it "the world's most sustainable vehicle." With an announced starting full-purchase price of $37,499, this green driving machine features a full-length solar roof, fully recycled nylon carpeting, a so-called "vegan interior" (with 100 percent polycarbonate and polyurethane surfaces with 100 percent reinforced

This visual representation of Toyota's planned Woven City shows its intended location, at the foot of Mt. Fuji in Japan. Courtesy of Toyota

Envisioning Toyota's Woven City

Toyota Motor Corp. President Akio Toyoda at CES 2020 revealed plans to build what he calls his personal "field of dreams"--a 175-acre prototype "city" of the future, at the base of Mt. Fuji in Japan. The company intends to break ground for the site in early 2021.

Called the Woven City, it will serve as a "living laboratory" or "urban incubator," and home to full-time residents and researchers who, Toyoda said, "will be able to test and develop technologies such as autonomy, robotics, personal mobility, smart homes and artificial intelligence in a real-world environment." The smart city will be a fully connected ecosystem powered by hydrogen fuel cells.

Residents will include Toyota employees and their families, retired couples, retailers, visiting scientists, and industry partners. "The plan is for 2,000 people to start, adding more as the project evolves," the company said.

"Building a complete city from the ground up, even on a small scale like this," Toyoda told a packed ballroom on Jan. 5, "is a unique opportunity to develop future technologies, including a digital operating system for the city's infrastructure. With people, buildings and vehicles all connected and communicating with each other through data and sensors, we will be able to test connected AI technology ... in both the virtual and the physical realms ... maximizing its potential."

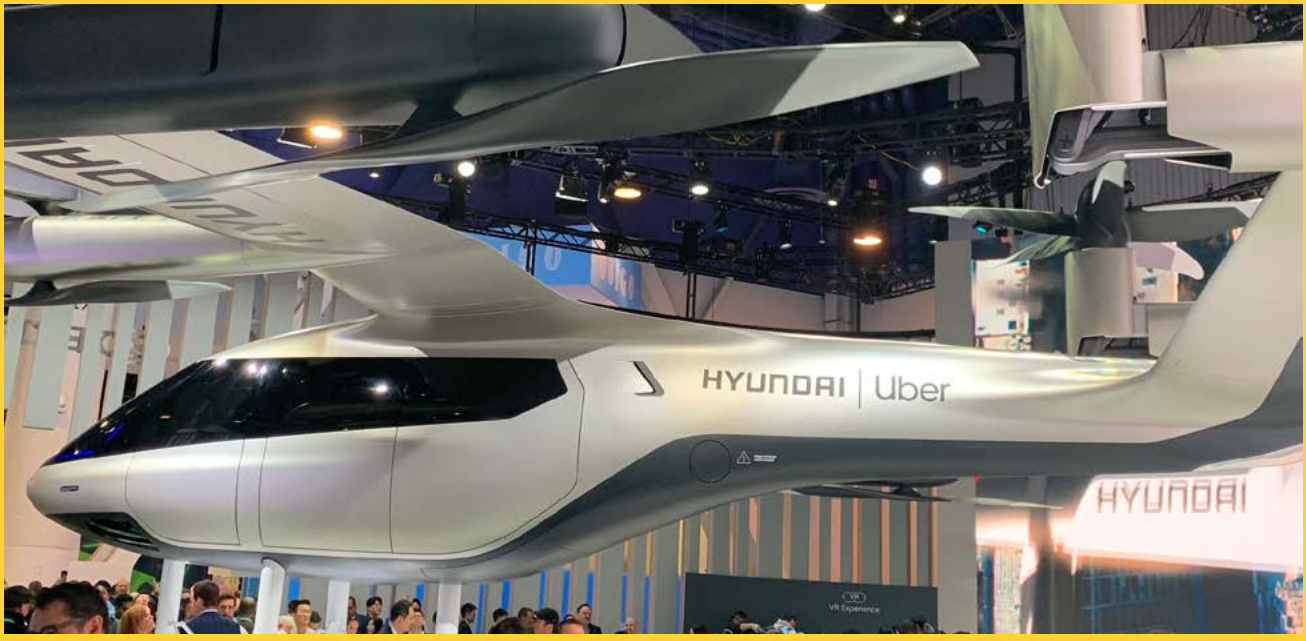
Toyoda shared the stage with 45 year-old Danish architect Bjarke Ingels, principal of the Bjarke Ingels Group (or BIG), with whom Toyota has been collaborating for the past eight months on the concept and design. Ingels, who now lives in New York City (where he is designing the new Two World Trade Center building), said Woven City is conceived as a flexible network of streets dedicated to various speeds of mobility for safer, pedestrian-friendly connections.

The Toyota e-Palette, an autonomous clean, multi-functional, shuttle-like vehicle, will be used for shared transportation and deliveries. The buildings will be constructed of timber, using traditional Japanese wood joining techniques, combined with robotic production methods. A mix of housing, retail and business--to be built primarily of carbon-sequestering wood with photovoltaic panels installed on the roofs--will characterize each city block.

Residences in Woven City will test new technology such as in-home robotics to assist with daily living. These smart homes will use sensor-based AI technology to perform functions such as checking on the occupants' health, and handling automatic grocery deliveries, laundry pick-ups or trash disposal, according to BIG.

The aim, Toyoda said, is for people, buildings and vehicles to all be interconnected in the city and to turn AI into "intelligence amplified."

For more details and visual depictions of Woven City, go to www.big.dk/-projects-twc while interested partners can visit www.woven-city.global.



South Korea's Hyundai Motor Co. is partnering with Uber to develop Uber Air Taxis the firms foresee eventually providing point-to-point passenger service on demand in urban areas. This full-scale prototype model hung above the Hyundai booth at CES. Photo by Robert Grace

Hyundai, Uber Plan to Take Flight

Uber and South Korea's Hyundai Motor Co. are partnering to develop Uber Air Taxis for a future aerial ride-share network. While Hyundai does not project the concept to become a reality till 2029, the companies showcased a full-scale model with moving rotors that hung tantalizingly above Hyundai's CES booth.

Hyundai's says its Urban Air Mobility (UAM) "will vitalize cities by enabling on-demand urban air mobility in Uber's Elevate Network." It said it is the first Uber Elevate partner with the manufacturing capabilities to mass produce Uber Air Taxis, while also having a track record of mass-producing electric vehicles.

The 7,000-pound aircraft is designed for a cruising speed up to 180 miles per hour, a cruising altitude of around 1,000-2,000 feet above ground, and to fly trips up to 60 miles.

The Hyundai vehicle will be 100 percent electric, using distributed electric propulsion, powering multiple rotors and propellers around the airframe to increase safety by decreasing any single point of failure. Having several, smaller rotors also reduces noise relative to large-rotor helicopters with combustion engines, which is very important to cities. During peak hours, it will require only about five to seven minutes for recharging.

With two tilt-rotors on the tail and 10 other rotors distributed around the egg-shaped cabin, the aircraft measures 35 feet long, with a wingspan of just over 49 feet. It is designed to take off vertically, transition to wing-borne lift in cruise, and then transition back to vertical flight to land.

The air vehicle concept Hyundai released at CES—dubbed S-A1—was created in part through Uber's open design process, a NASA-inspired approach that it says jumpstarts innovation by publicly releasing vehicle design concepts so any company can use them to innovate their air taxi models and engineering technologies.

In this partnership, Hyundai says it will produce and deploy the air vehicles, and Uber will provide airspace support services, connections to ground transportation, and customer interfaces through an aerial ride share network. Both parties are collaborating on infrastructure concepts to support take-off and landing for this new class of vehicles.

Hyundai said the vehicle—designed for four passengers—will be piloted initially, but over time will become autonomous.

Uber's analysis projects that an electric vehicle will travel at a speed up to 200 mph and that eventually, after several years in a market, an Uber Elevate ride will cost the same as an UberX car ride of the same distance.

Hyundai last September appointed Dr. Jaiwon Shin to head its new UAM "flying car" division. Shin, who most recently led NASA's Aeronautics Research Mission Directorate, is now executive vice president and head of the UAM unit. At CES, Shin told a ballroom full of media that he envisions eventual point-to-point air travel on demand, which he described as the "democratization of flight" and the "liberation from gridlock."

For more details: www.uber.com/us/en/elevate.

rayon backing), repurposed rubber waste, and Dinamica eco-suede, which uses recycled polyester derived from T-shirts and recycled PET bottles. It will come standard with an extended range (target of approximately 250 to 300 miles, depending on driving conditions). Using global and localized supply chains across the U.S., Europe and China, Fisker plans to begin production at the end of this year, and projects producing more than 1 million vehicles between 2022 and 2027.

» Even consumer electronics giant Sony Corp. and Panasonic Corp. of America got into the vehicle fray.

Sony unveiled an all-electric concept car, the Vision-S, meant to highlight its automotive-focused imaging technology. Courtesy of CES®

- Sony displayed an electric concept car called the Vision-S that the firm says focuses on "safety, entertainment, and adaptability." Its aim is to showcase its automotive-focused imaging technology, as the car featured 33 sensors inside and outside the vehicle that provide 360° of protection, or what Sony calls a "Safety Cocoon."
- And Panasonic revealed it has partnered with Silicon Valley-based startup Tropos Motors to develop a pair of production-ready, compact utility commercial vehicles that Panasonic calls "right-sized." These all-electric fleet truck concepts, powered by Panasonic's proprietary software and cloud services platform OneConnectSM, include a mini-firetruck that can access tighter spaces in an emergency. While a full-sized firetruck can cost up to $500,000, the Tropos firetruck, which is just 6.5 feet tall and has a 12.5-foot turning radius, costs one-tenth of that while having similar capabilities. Tropos's second concept vehicle, dubbed the Connected Last Mile Refrigeration Cargo, features small-compartment Vacuum Insulation Panel (VIP) insulated coolers that are said to stay 13 times colder than regular polyurethane coolers in the market. Panasonic calls them "the perfect solution for metro, small-store deliveries."

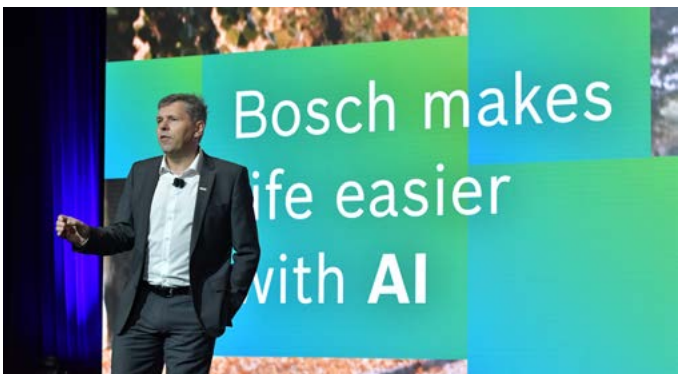
Working with Panasonic, Tropos Motors revealed its "right-sized" firetruck, which will cost 10 percent that of a typical firetruck, while offering similar functionality and greater mobility. Courtesy of Tropos Motors

Tier One automotive suppliers such as Faurecia, Bosch, Continental Automotive, and Valeo held media events and, again, mostly talked about the future of mobility, from smart cities to autonomous vehicles and the application of artificial intelligence (AI).

Bosch Goes All-In on AI

Bosch, for example, made clear its commitment to the technology, indicating it is training some 20,000 employees to become AI-savvy over the next two years. Its slogan is "Beneficial AI. Building trust together," and board member Michael Bolle said at the firm's CES press conference that by 2025, "every Bosch product will either contain artificial intelligence or will have been developed or manufactured with the help of AI."

The company cited market research firm Tractica in



At a pre-CES media event, Bosch board member Michael Bolle made it clear how his company is focused on developing artificial intelligence and in training its employees about AI. Courtesy of CES®

Bosch noted how it leveraged AI to develop the Virtual Visor, a vehicle sun visor that blocks only the areas where the sun blinds the eyes, while allowing an otherwise unobstructed view. Courtesy of Bosch

stating that the global market volume for AI applications is expected to be around $120 billion over that same period—a twelvefold increase compared to 2018. It also sees the technology significantly boosting GDP and creating 60 million new jobs by 2022.

Bosch is doing its part—the company is investing €100 million euros in the construction of a new AI campus in Tübingen, Germany, with plans to move in by the end of 2022. The firm will then offer some 700 AI experts space "for creative and productive exchange."

As a real-life example of AI in action, Bolle highlighted what he called the world's first transparent digital sun visor for vehicles. In touting the first major innovation of the 95 year-old sun visor, the company cited data that the sun causes twice as many car accidents as any other weather-related condition due to temporary blindness. A transparent liquid crystal display connected to the interior monitoring camera detects the position of the driver's eyes. Using intelligent algorithms, the Virtual Visor analyzes this information and darkens only the portion of the windshield through which the sun would dazzle the driver. The Virtual Visor scored the highest in its category at the CES Best of Innovation Awards.

For more details: www.bosch.com

Rinspeed Touts Modular Vehicles

Concept vehicles aplenty were on display, including one from Switzerland's Rinspeed AG called MetroSnap. Displayed at the booth of German lighting firm Osram GmbH, the modular vehicle features interchangeable components called the "skateboard" (the chassis) and the "pod" (the vehicle body). Rinspeed touted its simple, fast, safe, and inexpensive swapping system for the vehicle bodies for which it has filed for patent protection.

Rinspeed showcased "cargo" pods being used as customer-accessible parcel stations that are dropped off in the customer's neighborhood for a certain period, as well as a "corner health food shop," in which food is dispensed from mailbox-like slots. Consumers would access the roll-up door on the pod via a palm print, using a vein scanner, and then access their products via a digital lock. They also showed a passenger version.

The MetroSnap, made of two fiber-reinforced epoxy panels that are glued together, featured a number of plastics technologies.

Switzerland's Rinspeed AG displayed its MetroSnap modular concept vehicle on the CES stand of its partner, lighting maker Osram GmbH. The body can be easily swapped out on the chassis, enabling various end-use functions, from moving people to dispensing packages or food. Photo by Robert Grace

Swiss polyurethane foam producer FoamPartner Group provided lightweight foam solutions that delivered both acoustic and thermal insulating properties. Osram's lighting also featured extensively in the MetroSnap, including interior applications such as ambient lighting and face recognition, to exterior uses such as the LED license plate, signal displays, and LiDAR (light detection and ranging) sensors.

"The future belongs to modular mobility systems," according to Rinspeed, whose founder and CEO Frank M. Rinderknecht declared, "The crucial step towards series production has now been taken."

For more details: www.rinspeed.eu

Connected Eyewear Boosts User Safety

Feeling drowsy at the wheel? If a 3 year-old French company has anything to say about it, your smart eyeglasses may help save your life.

Ellcie Healthy SAS, in collaboration with several partners, has developed lightweight, trendy-looking eyeglasses with frames molded from nylon 12, that are infused with artificial intelligence. Each pair features 15 sensors, embedded in the frame, that can detect a number of different factors, including nodding, blinking, and even yawning, according to Thierry Muela, the company's chief industrial officer.

Ellcie sources the nylon resin for the frames from Switzerland's EMS Grivory, said Muela in an interview at his company's CES stand. He noted that his firm molds the plastic components in-house. The frames can accept normal prescription or sunglass lenses.

The AI algorithms in the compatible smartphone app process the data into information and/or predictions on the wearer's health and safety. It calculates the data and uses it to instantaneously assess the wearer as being in one of five risk categories, based on his or her attentiveness and physical symptoms.

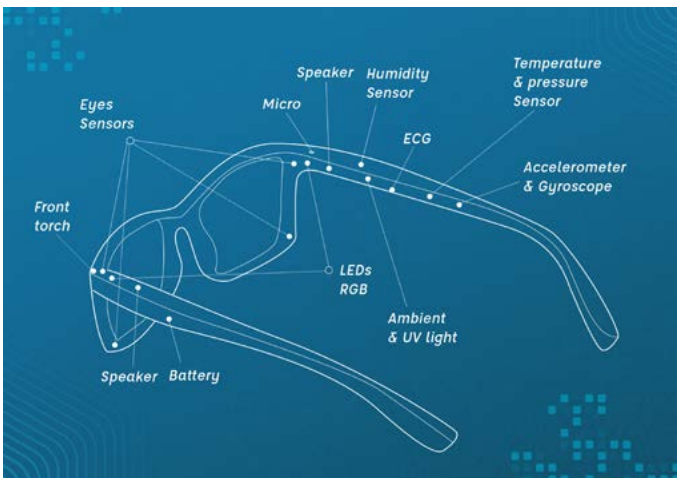
Thierry Muela, chief industrial officer of France's Ellcie Healthy SAS, modeled a pair of his firm's smart eyeglasses, which use AI and sensors to monitor the wearer's level of drowsiness or distraction, and to alert them via lights and sounds. Photo by Robert Grace

When the AI determines the user is at risk, the glasses deliver a physical alert, in the form of light flashes on the side of the eyes and a buzzing sound. Théo Niktabe, the firm's U.S. business manager who was due by February to relocate full-time to West Palm Beach, Fla., said at CES that the AI is smart enough that users cannot fake it out by pretending to nod off.

Based in Villeneuve-Loubet, in southeastern France (near Nice), Ellcie Healthy developed this technology in partnership with the scientific community. The firm worked with INRIA, France's National Institute for Research in Digital Science and Technology, which helped with mathematical algorithms; with LEAT, the Electronics, Antennas and Telecommunications Laboratory, which assisted with the electronics; and with LAMHESS, the University of Nice's Laboratory of Human Motricity, Education and Health, which selected the embedded sensors.

Finally, the Hôpital Hôtel Dieu in Paris provided the methodology and clinical testing for monitoring blinking and detecting drowsiness.

The advantage of such connected eyewear is obvious for long-distance drivers, but these glasses also are said to be able to detect and prevent falls. Additionally, they could be useful for factory jobs, in which reduced attentiveness may translate accidents.



Ellcie Healthy embeds 15 sensors in their eyeglass frames, made of nylon 12, that can detect a number of different factors, including nodding, blinking, and even yawning. Courtesy of Ellcie Healthy

Niktabe said Ellcie has sold 15,000 pairs of frames in France already, and will use distributors to sell them elsewhere soon. They are priced at about $300 a pair, according to Muela.

For more details: www.ellcie-healthy.com

PassiveBolt Makes Home Entry Easy, Smart

Kabir Maiga, CEO of Ann Arbor, Mich.-based startup PassiveBolt Inc., worked on the team at Continental Automotive that developed the touch-enabled entry technology now popularized on so many current vehicles. As long as you have the key fob with you, you can open your car doors by simply touching the sensor on the door handle.

Maiga wanted to make that user experience seamless by extending similar entry technology to the door locks on your home, using the smart phone as the "fob." So about two years ago, he got to work. He and a partner founded PassiveBolt, whose new, smart Shepherd Lock involves a

Kabir Maiga, chief executive officer of Michigan startup PassiveBolt Inc., leveraged his keyless-entry work with Continental Automotive and applied it to a novel smart-home application. Courtesy of PassiveBolt

mechatronic module that works based on simple touch—no fingerprints or biometrics needed.

The product detects and responds to tampering activities such as lock picking by automatically dead-bolting consumer homes in response to detected threats. PassiveBolt provides automotive-grade touch technology to homeowners allowing them to use their smartphones for keys and a cloud-based platform and Bluetooth for consumers to stay updated on their home security.

The award-winning Shepherd Lock involves a mechatronic module made of polycarbonate that can be applied over existing dead-bolt locks, and works based on a simple touch. Courtesy of PassiveBolt

The system, which earned a CES 2020 Innovation Award in the Smart Home category, allows users to lock and unlock their door inside and outside with a touch. Shepherd Lock is an add-on that converts the existing lock-set into a touch-activated device, allowing homeowners to keep their existing lockset and keys.

Maiga says Shepherd is the first and only product that uses a patent-pending combination of sensors and AI to actively monitor your lock 24/7. The smart home technology can detect lock picking or tampering attempts and automatically freeze the deadbolt into a locked position in response. Shepherd notifies the homeowner immediately through the secure mobile app. The app also allows homeowners to manage home access, view access history, share electronic keys, and remotely control the lock. It even can tell the homeowner the number of degrees the door is open, should it be ajar.

Finland's TactoTek Oy, known for its injection-molded structural elements (IMSE™) technology that integrates plastics and electronics, provided the know-how for many of the features in Shepherd Lock's smart surface. The IMSE part is a smart cover—a cosmetic surface that provides both structure and electronic functions. Molded within that IMSE part are printed electronics for circuitry, a capacitive touch control, contact pads for external connectivity, and LEDs for illumination to indicate lock status.

Maiga and TatkoTek opted to use Covestro LLC's polycarbonate for the lock's silver enclosure, black face plate, and all the plastic parts. The cover plate, mounted on the inside of the home's door, over the existing deadbolt, snaps on magnetically, and the entire module—which is powered by four AA batteries—can be mounted with just two screws.

Maiga said in a post-show telephone interview that Shepherd Lock will go on sale, via Amazon and its website, in March for $249.

For more details: www.shepherdlock.com

Enabling 3D Printing from Reclaimed Resins

Houston-based re:3D Inc. says it is "committed to decimating the cost and scale barriers to industrial 3D printing." With its latest offering, dubbed the Gigabot X, the company has created a series of 3D printers that can directly process reclaimed plastic pellets or flake.

The firm intends to commercialize the new machines this year, according to Louis Noel, customer support manager, who was staffing the firm's small stand at CES, along with mechanical engineer Helen Little. The company, which manufactures and assembles the 3D printers in its Houston factory, is still developing the grinder and dryer that will be part of the Gigabot X system. Noel said it will be an "all-in-one solution."

By using a process called fused granular fabrication (FGF)—sometimes also called fused particle fabrication (FPF)—re:3D believes it has the potential to increase recycled polymers in the additive manufacturing process. The key, Little notes, includes research to characterize a variety of materials, optimizing temperature, and extrusion rate settings, and improving feeding throughout the system, including compression screw dimensions, extruder dimensions, and connection points.

Samantha Snabes and Matthew Fiedler co-founded the

Houston-based re3D Inc. says its new Gigabot X series of 3D printers can directly process reclaimed plastic pellets or flake. Here, the firm's Louis Noel and Helen Little showcase the machine at their small CES booth. Photo by Robert Grace

company in 2013. Both previously worked for NASA at the Johnson Space Center, and the firm's current team consists of former NASA-contracted technicians, strategists, and engineers. re:3D also has offices and employees in Austin, Texas, and San Juan, Puerto Rico, with a few printers in each location.

Printing with a larger nozzle while using pellets or flakes, the company claims, is five to 10 times cheaper than using traditional filament, while also greatly reducing printing time. It says the Gibabot X can print up to 17 times faster that fused filament fabrication (FFF) printers.

Gigabot X can print with plastic pellets or regrind particles that about 1/8" in length, or up to 5mm. The plastic must have a melting point below 270° C, which includes most common 3D printing plastics. Users can easily mix multiple types of plastic pellets or regrind in the same print by simply pouring them into the hopper. Examples of this includes mixing ratios of different colors of the same material to achieve a specific color, or mixing the same type of plastic from different sources when recycling regrind.

After a successful Kickstarter campaign to launch the initial Gigabot X pellet printer, re:3D has been working to optimize the print parameters and tensile test the mechanical properties of various virgin and recycled plastic pellets.

Little says the firm has successfully printed with polylactic acid (PLA), recycled PLA (rPLA), copper-filled and bamboo-filled PLA, glycol-modified PET (PETG), rPETG, glass-filled PETG, ABS, carbon-fiber-filled ABS, recycled polycarbonate (rPC), PET, rPET, thermoplastic urethanes (TPUs), and nylons.

"We have been able to extrude with polypropylene and HDPE," she adds, "but since these materials are prone to warping, they require a high-temperature enclosure to prevent warping during printing. We are currently developing such an enclosure for Gigabot X through our NSF [National Science Foundation] grant, which will enable us to print with materials like PP and HDPE, as well as high-temperature materials like PEEK and Ultem polyetherimide. We have tested materials in the form of virgin pellets, recycled pellets, and granulated plastic waste."

For this new line, the print envelopes range from roughly 24" x 24" x 18", up to 36" x 36" x 31". The machines in the series are named (from smallest to largest): Gigabot X, Gigabot X XL, Gigabot X XLT, and Terabot X. All of them have the same pellet extruder, Little notes, with the difference being the print volume size.

"The sizes listed are our standard sizes, but we also do custom sizes for larger printers. Our current goal," she says, "is a shipping container-sized printer."

Last year, re:3D won the City of Austin's Reverse Pitch competition, a contest designed to advance the city's goal of being zero waste by 2040. For the competition re:3D chose to work with a polycarbonate waste-stream from security card manufacturer HID Global and pitched the idea of creating usable furniture and home products from a stream of post-manufacturing waste PC.

The company also is currently developing a partnership with the Austin Habitat for Humanity's REstore, which is Habitat's line of shops that sell used and refurbished items. While not an official partnership yet, Little says, "We're working on a number of different opportunities with the REstore. First, we are going to release a line of recycled furniture which will be sold there. The first items will be chairs and side tables printed on our Gigabot X 3D printer, using recycled plastic feedstock and wood from the REstore.

"Next, we are installing a grinder system at the REstore, which we will use to take the polycarbonate feedstock from the Reverse Pitch competition and turn it into a usable feedstock for the Gigabot X 3D printer. We will then use this ground-up PC to create more furniture and home objects for sale at the REstore.

"Finally, she notes, "we are going to work with the REstore

to analyze the waste plastics that are going through their donation area, to assess their usability as a feedstock in 3D printing as well—which will reduce the REstore's waste stream, by turning bins or products that would not be sellable into sellable items.

For more details: www.re3D.org

The Box, for E-commerce Shipments

A French start-up company called LivingPackets has developed a collapsible, reusable, plastic "smart" box that the firm believes can replace hundreds of millions of cardboard boxes in the e-commerce market over the next 10 years.

The Box contains integrated sensors that measure temperature, humidity, and shocks. Shipping details on the digital e-ink label can be altered remotely, and all data can be accessed via the built-in internet connection. A camera is used to monitor the contents en route. It also features an integrated locking system and can detect any unauthorized opening attempt. A mesh net on the interior is used to help hold the contents safely in place.

Emmanuel Lemor, of French startup LivingPackets, says The Box, a collapsible smart container made of expanded PP foam, can replace hundreds of millions of cardboard boxes in the e-commerce market over the next 10 years. Photo by Robert Grace

The larger-capacity box measures roughly 15 x 20 x 9 inches, and has an internal volume of 25 liters (6.6 gallons), which can accommodate up to two shoe boxes. The small-capacity box measures 19 by 26 by 3 inches, has an internal volume of 1 liter (0.25 gallons), and is designed to hold objects as small as a SIM card or book, documents, or a T-shirt.

The product, designed in-house over the past three years by the Nantes-based firm, is made of recycled expanded polypropylene, in a black color with distinctive, bright green flecks dispersed throughout. The rigid container offers excellent shock absorption and can be reused up to 1,000 times, the company says, before it is refurbished and reused for another 1,000 times.

LivingPackets claims The Box can "eliminate 100 billion cartons each year," while delivering a very positive e-commerce user experience.

In addition to potentially replacing single-use cardboard boxes, The Box also eliminates the need for polystyrene packing peanuts, Bubble Wrap, and Scotch tape, according to Emmanuel Lemor, head of customer experience at LivingPackets. In an interview at CES 2020, Lemor said his firm is planning to officially launch the product this summer in Europe and by 2021 in the United States.

Plans are for LivingPackets to rent out the boxes to customers. Lemor said that using The Box—which for closed-loop, business-to-business clients would cost €200 per box—works out to "the same cost as buying a box at the store" on a per-use basis. He said LivingPackets is making the product in France now, but plans to make it in the U.S. and Mexico once demand warrants in North America.

The durable, lightweight box ships flat-packed when empty, but when "assembled" with the sides up, offers space on the sides and top that can be branded with customer logos and information.

In 2019, after extended development, LivingPackets started testing The Box via pilot programs in France with its first partners—telecom company Orange and e-commerce firm Cdiscount. It said those tests proved successful and provided the company with its first insights in a real-world environment.

The LivingPackets team—which has grown to more than 50 employees with offices in France, Germany, and Switzerland—is offering, as a further incentive, a profit-sharing deal to anyone who contributes financially to the company. The product also can be easily integrated as a plug-and-play solution for warehouse operators.

The Box, claims LivingPackets, is addressing major issues in the growing $4 trillion e-commerce market, as packaging for online deliveries is said to be responsible for the destruction of 700 million trees and 8 million tons of plastic that pollute the oceans each year.

For more details: www.livingpackets.com

Cosmo Offers Safety Light for Bikers

Paris-based startup Cosmo Connected at CES 2020 unveiled version two of its detachable safety light designed to be mounted magnetically onto the back of helmets used by cyclists, scooter riders, and motorcyclists—or even to a bike saddle. It introduced its initial version at last year's CES and has sold about 30,000 units in the past year in Europe, according to Alexandra Weil, the firm's marketing director.

Engineered in France and manufactured in China, the device uses an internal accelerometer to sense deceleration, triggering a bright oval of red LEDs. It is molded from ABS resin and contains 96 total LED lights—48 red and 48 orange—Weil said in an interview at the show. It uses acrylic inside the light enclosure to scatter the light. The orange lights act as a right or left turn signal, flashing the intended direction for 10 seconds. The lithium ion battery is rechargeable in two hours using a micro USB cable, and a single charge lasts about eight hours in normal use, Weil said.

Alexandra Weil, marketing manager of Paris-based startup Cosmo Connected, says her firm has developed a detachable, oval safety light featuring 48 LEDs that affixes to the back of helmets worn by cyclists. Photo by Robert Grace

The outer helmet shell, which Cosmo does not manufacture, is made of polycarbonate, and a dial on the back of the helmet allows one to adjust the mesh inner liner to allow the helmet to fit different size heads, she explained. The entire bicycle helmet, as displayed at show, weighs 430 grams (15.2 ounces), and the light alone weighs just 40 grams (1.4 ounces).

The smart light is connected via Bluetooth to a mobile app that serves various purposes. It connects wirelessly to a small remote control fitted to your handlebars. Geolocation tracking allows users to share their journey with friends and family, and a fall detection feature can alert up to three already registered emergency contacts within three minutes in case of accident.

Cosmo Connected, which developed the hardware and software, is working on U.S. distribution now, Weil noted; that network should be ready by mid-year. But one still can order anytime online now.

The firm currently offers three versions of the helmet—a basic model with no ear flaps ($99), a sportier version with air vents ($119), and the model with ear pads and the two visors—one clear for eye protection and the other tinted as a sunshade ($149). The helmets are available in two colors—glossy white or matte black. The light only, which can be attached to other helmets, costs $69.

For more details: www.cosmoconnected.com.

P&G Publicizes Connected Innovation

Despite being 182 years old, consumer products giant Procter & Gamble Co.—whose brands include Gillette, Pampers, Charmin and Oral-B—is doing its best to act like a startup.

The Cincinnati-based firm made its CES debut in 2019 and kept a high profile at the show this year, with its P&G LifeLab exhibit where it showcased a number of recent innovations—from "smart" diapers and a toilet paper-delivering robot to a heated razor, a connected toothbrush, and an Opte handheld inkjet printer designed to help cover up unwanted skin pigmentations.

Procter & Gamble displayed a number of innovative products, but few garnered more publicity than its Charmin Rollbot, a tiny prototype robot you control via Bluetooth on your smartphone to deliver a roll of toilet paper when it is most needed. Courtesy of Procter & Gamble

The tongue-in-cheek Charmin Rollbot, a tiny prototype robot you control via Bluetooth on your smartphone to deliver a roll of toilet paper when it is most needed, garnered much of the media hype. But a simpler, less-promoted product stood out for its practicality. The Gillette Treo razor, which P&G calls "the world's first razor designed to shave someone else," actually launched in late 2018 but still was showcased on the stand. It is meant to be used by caregivers who need to shave a patient or family member.

The Treo's tube-like ergonomic handle contains a special, non-foaming gel dispenser that lubricates for the shave without water and also can serve as an aftershave. The blade is equipped with a safety comb to help protect against nicks and cuts, and has an open design to prevent clogging. The handle pivots to allow the user to hold it like a paintbrush.

P&G's simple but functional Treo razor—dubbed "the world's first razor designed to shave someone else"—is designed to help caregivers shave those who may struggle to shave themselves. Courtesy of Procter & Gamble

Asked to provide details about the plastics used in the product, a P&G spokeswoman replied, "We don't disclose information about our proprietary manufacturing processes or exact materials for competitive reasons."

The Treo costs $7.89 for a pack of four, or $25 for a pack of 15, and has earned innovation awards from Fast Company and Time magazines. P&G says it also is partnering with New Jersey recycling company TerraCycle to recycle all of its disposable razors replaceable-blade

Yes, Segway (now owned by the Chinese) is back--this time with the self-balancing S-Pod, in which the user sits and can scoot around enclosed campuses such as airports, theme parks, and malls. Courtesy of Segway-Ninebot

cartridge units, and razor plastic packaging, including the Treo.

For more details: www.PGLifeLab.com

Segway Rolls Out the 'S-Pod'

Remember the Segway PT—the two-wheeled, self-balancing personal transporter (don't call it a "scooter")—that inventor Dean Kamen brought to market with much fanfare in 2001? It didn't quite revolutionize personal transportation as he planned. But, not to be deterred, the realigned (now Chinese-owned) company was back at CES 2020 with its latest vehicle—the S-Pod.

Ninebot Inc., an 8 year-old, Beijing-based transportation robotics startup and a rival to Segway, acquired Segway in April 2015 after raising $80 million from Xiaomi and Sequoia Capital. Segway-Ninebot, as its now called, unveiled the S-Pod, which it describes as a "smart transporting pod for enclosed campuses such as airports, theme parks and malls. It is a safe, self-balancing vehicle that is operated by an intuitive assistive navigation panel." In this device, the rider is seated.

With an adaptive center-of-gravity automatic control system, it says passengers can easily adjust the speed—up to 24 mph—by handling the knob to change the center of gravity in the pod. The S-Pod spins and rotates by the center smoothly for directional changes. Unlike on the original Segway, the rider does not need to physically lean forward and back to accelerate or slow down. Also, since the "brake" is placed by the shift of the center of gravity, the company says "it eliminates the possibility of the S-Pod tipping over in any situation."

The S-Pod, the firm says, is "the first step in Segway working towards their goal of bringing new transportation options to cities."

For more details: www.segway.com.

Interested readers can find more about CES, including videos of some of the keynote addresses, at https://ces.tech.

ABOUT THE AUTHOR

Robert Grace is a writer, editor and marketing communications professional who has been active in B2B journalism since 1980. He was founding editor of and worked for 25 years at Plastics News, serving as editorial director, associate publisher and conference director. He is now both editor of SPE's *Journal of Blow Molding* and a regular contributor to various outlets. A long-time member of the Industrial Designers Society of America, he runs his own firm, RC Grace LLC, in Daytona Beach, Fla., and can be contacted at bob@rcgrace.com.