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CES 2021
is all-digital

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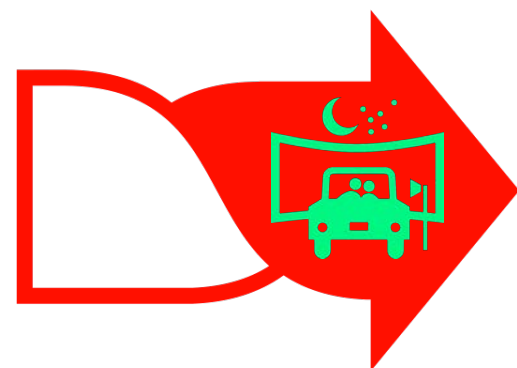
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ADAPTATION, CHANGE, SNAPBACK? OPPORTUNITY



Adaptation

COVID-19

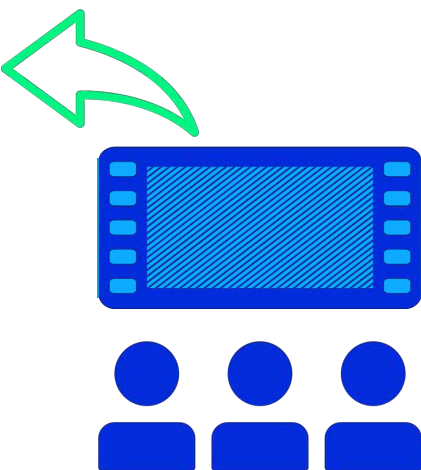
Technology providers and media companies compelled to respond have overnight altered and innovated ways to survive the pandemic. Some have enjoyed new success while others struggle to stay above water.



Change

Acceleration

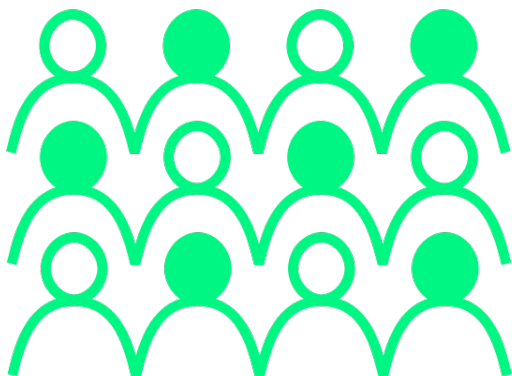
Companies leading or preparing for established trends were enabled by the pandemic necessities to accelerate their development and deployment. Social, economic, and technology factors reflected in product introductions and market adoption.



Snapback?

Return⁺

Our world will return but likely altered and with some longterm accelerated change. Some expected directions will need to change in response to a new order of relevancy. New opportunities have longterm benefits and costs. What will snapback and will not?



Opportunity

Better Normal

Audience practice and expectations have been altered. Technological change has flooded in to meet needs and also suggests that the social change and device experience now forms a platform of experience innovation that can be an accelerated opportunity.

CES 2021: Towards a Better Normal

ALL-DIGITAL CES LOOKED BEYOND LOCKDOWN



CES 2021 virtual conference

About This Report

The 2021 CES Report is presented by the Entertainment Technology Center at the University of Southern California (ETC), a research center and think tank organized within the School of Cinematic Arts. Find more Information at etccenter.org, read the latest industry technology news at etccentric.org, and subscribe to our free [Daily News Brief](#).

Our reporting from CES 2021 presented here, and in a narrative presentation by ETC analysts that becomes available after the completion of a series of live-onsite briefings, highlights products, technologies, companies, issues, and trends important to media, entertainment, and technology companies.

About ETC@USC

The Entertainment Technology Center at the University of Southern California is a think tank and research center that brings together senior executives, innovators, thought leaders, and catalysts from the media & entertainment, consumer electronics, technology, and services industries along with the academic resources of the University of Southern California to explore and to act upon topics and issues related to the creation, distribution, and consumption of entertainment content. As an organization within the USC School of Cinematic Arts, ETC helps drive collaborative projects among its member companies and engages with next generation consumers to understand the impact of emerging technology on all aspects of the media and entertainment industry, especially technology development and implementation, the creative process, business models, and future trends. ETC acts as a convener and accelerator for entertainment technology and commerce through Research, Publications, Events, Collaborative Projects and Shared Exploratory Labs and Demonstrations.

CES 2021: Towards a Better Normal

ALL DIGITAL, ALL VIRTUAL



CES 2021 behind the scenes (TWITTER: @CES)

Introduction and Summary

The sprawl of CES, typically measured in millions of square feet of exhibit space, multiple venues, and hundreds of thousands of attendees, spanned the globe as the Consumer Technology Association (CTA) set “the global stage for innovation” in an all-digital format when it opened its four-day run on January 11. However dispersed, CES Week was still the focal point for the consumer technology sector and trends will emerge, even if news and product announcements will originate from both CES events and individual company presentations.

CES 2021 shaped up less as a showcase for breakthrough future technology and more as a bellwether for a world massively altered by the COVID-19 pandemic. This year, instead of four or five key product trends to define our media and entertainment industry focus, the ETC@USC team focused on these four dynamics to drive much of the discussion: Adaptation, Change, Snapback and Opportunity.

Without question, the pandemic forced virtually every industry to accelerate their digital transformation. “As a world we have moved to this digital transformation quicker,” said Gary Shapiro, CEO of CTA, at a pre-show media briefing. “Technology changed us and allowed us to live, work and learn at home all while keeping valuable connections with each other.”

Technology providers and media companies have been compelled to respond and have overnight altered and innovated ways to adapt and survive the pandemic. Some have enjoyed new success while others struggle to stay above water.

Some of these adaptations do represent a fundamental change. Companies leading or preparing for established trends, such as the advent of 5G, AI, augmented reality, OTT, smart homes and digital health were enabled by the pandemic necessities to accelerate their development and deployment.

Deployment of the coronavirus vaccine in 2021 will enable some measure of return to pre-pandemic behavior. Moviegoing and live music will not remain confined to online consumption forever. We will be looking for examples and indications of snapback but expect that “return to normal” will include pandemic accelerated improvements and new opportunities.

Never in between CES shows has the entire world changed more dramatically. Audience practice and expectations have been altered. Technological change has flooded in to meet needs and also suggests that the social change and device experience now forms a platform of experience innovation that can be an accelerated opportunity.

“There’s so much out there that’s had to change because of COVID-19,” Shapiro told Dean Takahashi of *VentureBeat*. “Companies now have the opportunity to talk about what’s different. Every company has something different because of COVID-19.”

“As for hot technologies,” Takahashi reports, “Shapiro sees 5G broadband wireless networks taking off, 8K TVs, enterprise technologies, health tech, robotics, augmented reality and virtual reality, and drones.”

Keynote presentations from Verizon, GM, and AMD built on past appearances; however, the late addition of Best Buy’s CEO Corie Barry to the keynote lineup provided a street level perspective as well as a showcase for how Best Buy has

navigated a tumultuous retail environment.

Ann Sarnoff, chair and CEO of WarnerMedia Studios and Networks Group, looked at entertainment in the post-pandemic environment during a session that included a panel of leading marketers and media buyers. Further evidence of a consumer and retail focus this year were presentations by Mastercard and Accenture, Walmart and Microsoft, which is also providing the digital infrastructure for CES.

“Industry sales are up significantly in 2020 because people needed tech for education, for working from home,” Shapiro said in his *VentureBeat* interview. “They’re buying all sorts of things. Video games are off the charts. All sorts of things have jumped. 5G phones have jumped. 8K televisions hit almost a million units this year, and even more next year. 4K is incredible.”

“As for hot technologies, Shapiro sees 5G broadband wireless networks taking off, 8K TVs, enterprise technologies, health tech, robotics, augmented reality and virtual reality, and drones.”

The New York Times Tech Fix columnist Brian X. Chen looked at technology for 2021 and predicts continued transformation in the home shopping space, much of it driven by augmented reality built in to higher-end phones today. According to *eMarketer*, advertisers are expected to spend about \$2.4 billion on mobile AR advertising worldwide this year, which is up a significant 71 percent from \$1.4 billion in 2020.

Chen also sees Wi-Fi 6, a new generation of smart routers, optimizing bandwidth and “tech that virtualizes work and self-care.” Research by the *National Retail Federation and Forrester* found that “67 percent of retailers surveyed now accept

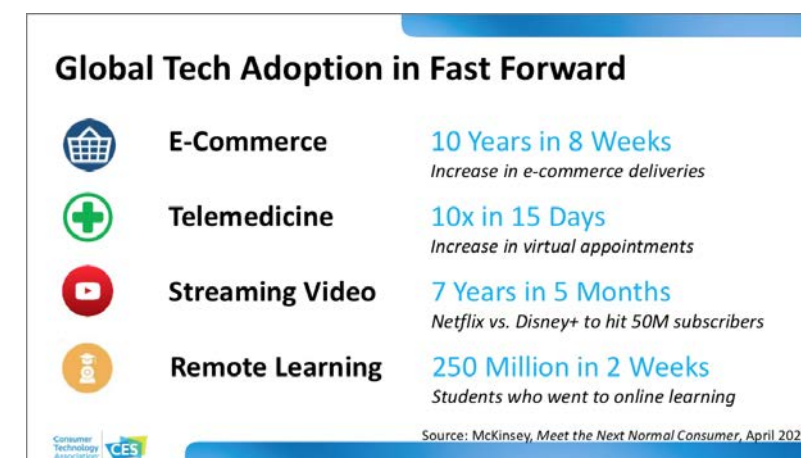
some form of no-touch payment. That includes 58 percent that accept contactless cards that can be waved past a card reader or tapped on the reader, up from 40 percent last year, and 56 percent that take digital wallet payments on mobile phones, up from 44 percent.”

Digital health and personal care have been a booming trend at CES for the past several years, even more so in this year of COVID-19. In his *Tom's Guide* CES preview, Mike Prospero observed, “The global pandemic affected a number of tech sectors, rapidly accelerating the adoption of at-home gym equipment, networking technology (think mesh routers), voice-enabled door locks, and more. And just because there's a vaccine doesn't mean that's going to change any time soon.”

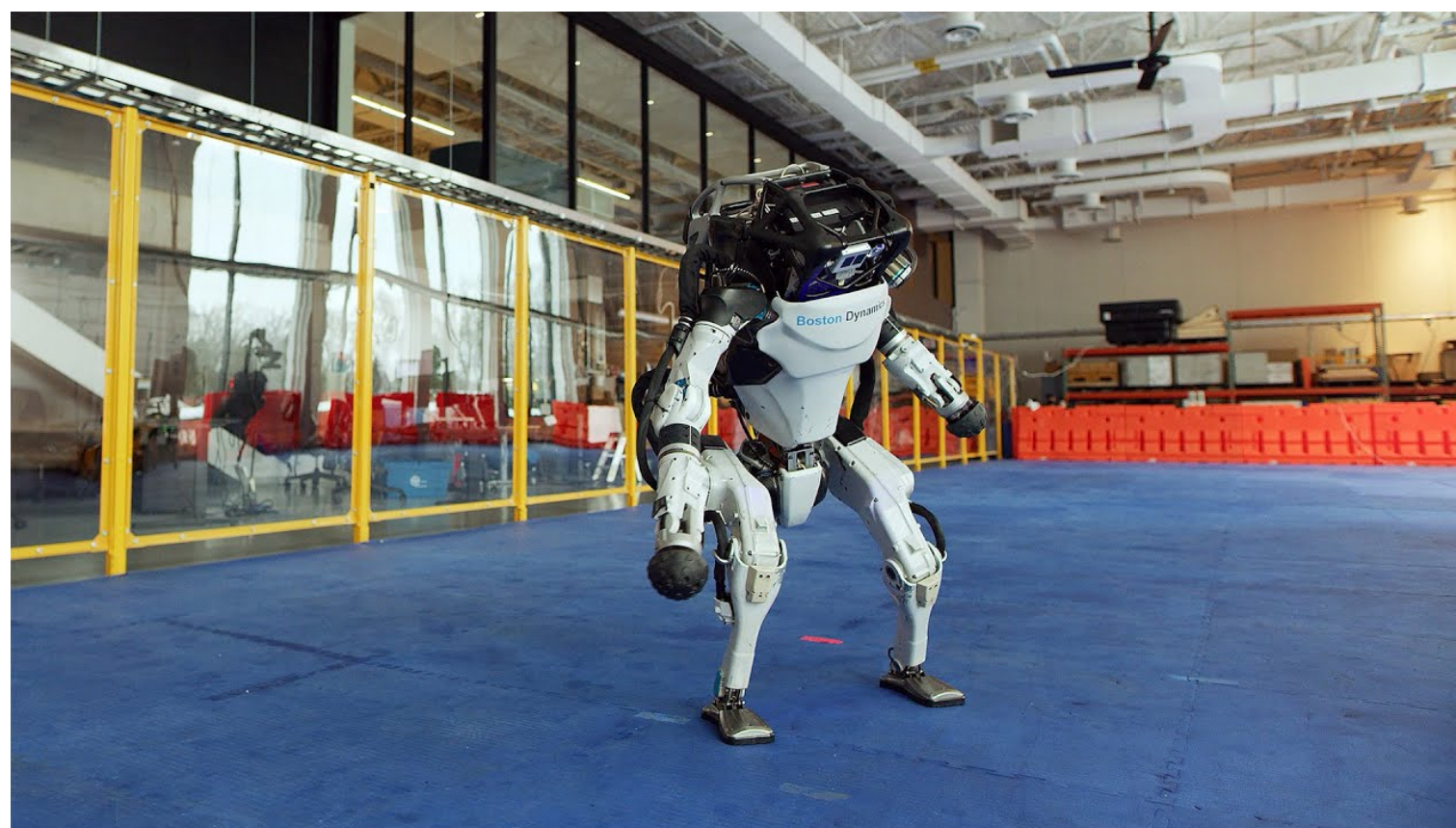
“People aren't suddenly going to get rid of their Peloton once the crisis is over,” CTA VP of market research Steve Koenig told Prospero. “These things are going to stick around because they're super convenient.”



“67% of retailers surveyed now accept some form of no-touch payment,” National Retail Federation and Forrester



CES 2021: Tech Trends to Watch - tidbits.com



Boston Dynamics - “Do You Love Me”

CES 2021 took place in the wake of a challenging year marked by political unrest, social upheaval and a global pandemic that continues to impact our personal and professional lives. And much like all that we're juggling in our current COVID world, the all-digital format of this year's CES presented a number of unique challenges, most notably how to determine which products and services are most relevant to an M&E audience without the benefit of interacting up close in person. We sifted through over a thousand hours of videos and virtual displays from 1300 companies to distill into this report. This report is a comprehensive overview of the show with a focus on four dynamic themes, rather than trends: Adaptation, Change, Snapback and Opportunity. We provide this snapshot of some of the key products, technologies, trends and announcements.

Acceleration, health, corporate responsibility, and entertainment were arguably the four hottest topics at CES 2021, none surprising on the surface. But under the subject of corporate responsibility, numerous companies — most notably General Motors, Microsoft, LG and Samsung — devoted substantial portions of their CES messaging to environmental and social/lifestyle issues. GM, for example, emphasized the shift to



Last Gadget Standing, the MojoVision, AR Contact Lens, ET VR controllers, and Music Artist Dua Lipa with Ryan Seacrest

electric vehicles, and Microsoft touted alternative energy sources to power their data centers and addressed delicate issues of privacy and cybersecurity. Reading beyond the virtual floor of CES, attention to these issues reflects the **values and priorities of a rising generation**. The demographic shift was also evidenced in the game sector, where **women now account for more than 45 percent** of the

audience and growing influence in game development.

“Acceleration” replaced “disruption” as the most repeated word of the show, regardless of industry. If there is a consensus to be drawn, it is that companies flirting with the future advanced their strategies. Media and entertainment companies, including those focused on

games and sports, had been moving towards a “Digital First” future before the pandemic put the hammer down.

“Our world looks different,” said Sebastian Seung, president and head of Samsung Research, “and you’ve been faced with a new reality, one where, among other things, your home has taken on a greater significance.” Meeting the audience wherever they are is the mantra and the creative industries demonstrated tremendous adaptability. Music artist Dua Lipa was “at” CES to talk about her star-studded virtual concert, “2054,” one of the year’s **breakout live-streamed events**.

Best Buy CEO Corie Barry offered a retail perspective. The company responded to the pandemic marketplace with three priorities: satisfying customers, protecting employees, and emerging from the pandemic as a vibrant company. Best Buy saw its sales rise 40 percent as consumers invested in stay-at-home products. Looking forward, she sees their **stories as “fulfillment epicenters”** in a digital first marketplace.

“For many retailers, we tend to start with humans; we’re just so geared to start with humans,” Barry said. “And instead this digital-first mentality is embedded in all the decisions we are making now, and by 2022, I believe it’s exactly how every consumer will for sure start their journey on what they are trying to get done in their homes.”

Digital health has been a growth sector for years at CES. The coronavirus pandemic created new opportunities, especially with home health monitoring and personal fitness. For example, Samsung showcased a number of products, including the Samsung Health Smart Trainer on Samsung 2021 TVs.

According to the company’s **CES 2021 media kit**, “Samsung Health seamlessly transforms the home into a personal gym, and the new Smart Trainer4 feature tracks and analyzes posture in real time, just like a personal trainer. During and post-workout, Smart Trainer provides feedback on form, helps you count your reps, and estimates calories burned. With video and interactive training via Bixby-enabled voice control, Samsung Health Smart Trainer elevates and personalizes the home workout experience.”

Among the more interesting new products, the **Mercedes-Benz 56-inch Hyperscreen** dashboard features a whole section designed for the front-seat passenger. And Sony continues to emphasize professional products designed for “adventurous creatives.” Among their offerings are the **new Airpeak drone**, **360 Reality Audio**, and an enhanced **Crystal LED special visual system** for production and other applications.

According to the show’s producer — the Consumer Technology Association (CTA) — this month’s first-ever all-digital CES was the largest digital tech event in history. “CES 2021 featured product launches from startups to tech giants, keynotes from global industry leaders, live entertainment from Hollywood and more than 100 hours of conference programming,” **notes the release**. “Almost 2,000 companies launched products during the all-digital CES 2021, including almost 700 startups from 37 countries.”

“CES showed how the pandemic accelerated the arc of innovation and illustrated the resilience and innovative spirit of our industry,” said Gary Shapiro, president and CEO, CTA. “From the latest innovations for the home and entertainment, and advances in 5G, vehicle technology, AI and digital health, the technologies at CES 2021 will pave the way for a brighter tomorrow.”

CTA TRENDS

CTA identified four key themes from CES 2021:

Tech Innovation Accelerated by COVID-19

Tech companies innovated during the pandemic, with companies at CES 2021 featuring smart masks, disinfecting robots, body sensors that detect COVID-19 symptoms and smart air filtration systems.

Consumer Privacy and Trust

The heads of privacy at Amazon, Google and Twitter discussed new privacy regulations and the need to increase consumer trust, stating that tech companies must give users more control over their data.

Global Tech Challenge

The Global Tech Challenge, launched at CES 2020, in partnership with the World Bank and CTA, rewards tech solutions in three areas: digital health in East Africa, resilience in India and gender equality around the world. The selected winners were announced this week from more than 1,000 applications, with three winners selected for gender equality, 10 for resilience and 17 for digital health.

Space Tech

NASA was joined by leaders from Lockheed Martin and Space Tango to discuss technology's role in accelerating space research and breakthroughs that will benefit all of humanity.

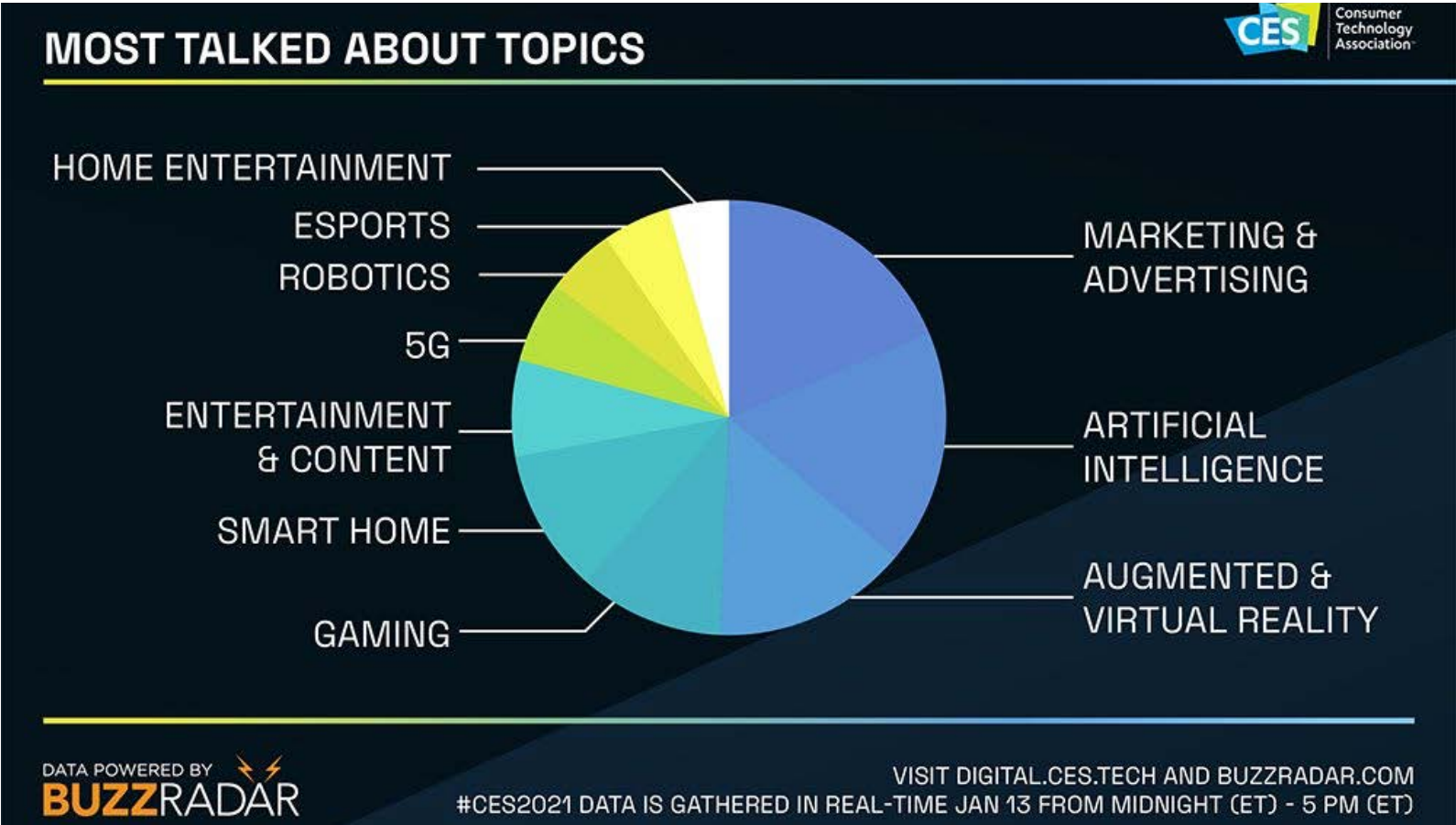
While CES 2021 featured innovation designed to improve our world — across areas including health, safety, sustainability and accessibility — the team at ETC explores these topics with perspective most relevant to the M&E industry, including many on the leading edge and precursors to future developments.

CTA Tech Trend Predictions

At the opening of the all-digital CES 2021 Consumer Technology Association vice president of research Steve Koenig and director of research Lesley Rohrbaugh described their predictions for innovation and technology trends to expect in the coming year, noting that the CTA provides 30 studies a year on its website. Koenig put 2021 in context as following a tough 2020 of COVID-19 and related economic downturn. “As a global community we confronted a lot of those challenges together and saw a myriad of solutions from tech innovation,” he said.

Referring to 2020 trends that will continue throughout the next year, Koenig noted that, “When the economy is at its worst, we see innovation at its best.” Proof of such acceleration, according to McKinsey data, includes the fact that it took Disney+ only five months to reach 50 million subscribers, a feat that took Netflix seven years to achieve.

The data reveals that e-commerce accelerated 10 years in eight weeks; telemedicine had ten-times growth in 15



TWITTER @CES

days; and, in two weeks, 250 million students went online. Other market segments that are in fast-forward mode include the Internet of Things, with AI and machine learning; robotics process

automation; natural language processing and cloud computing.

Rohrbaugh revealed that CTA research found six major areas of trending

technology: digital health, robotics & drones, 5G connectivity, digital transformation, vehicle technology and smart cities. She noted that connected health monitoring devices are pegged to rise to \$845 million in 2021, from \$632 million in 2020, a 34 percent uptick. The digital health industry will reach \$11.8 billion by 2027, she added.

She pointed out that, with regard to software-based interventions to enhance clinician decision and patient monitoring, Epsy, an epilepsy monitoring app, was honored with a CES 2021 innovation award.

Wearables are now available not just in wrist-located devices, but rings (**Oura Ring**) and chest-monitors (**BioButton by BioIntelliSense**, another CES innovation honoree).

Digital transformation, noted Koenig is taking place for small businesses such as gyms as well as education and legal environments. He also described the impact of COVID-19 on the growth of robotics, from robots that clean and disinfect to drones and robots that make contactless delivery and stock shelves. Rohrbaugh noted Amazon's autonomous delivery Scout, which has had a "greatly accelerated implementation" and the UPS/CVS partnership with **Matternet's M2 drones**.

With regard to cloud computing, Flexera data showed in its 2020 State of the Cloud report that the pandemic ignited a speedier transition, with 59 percent of those surveyed expecting that cloud usage will exceed plans due to COVID-19. Sixty-two percent plan to focus on cloud migration and 83 percent cited security as their top cloud challenge, followed by cost.

Trends in smart cities and vehicles/transportation are linked to the increased availability of 5G. Koenig reported that about 135 commercial 5G networks reaching more than 1 billion people around



Could this “Disinfection Gate”, developed by Insenso and BioAKT, be the extra measure of health safety that makes it possible to reopen theaters and arenas? It works by neutralizing microbes.

the world have debuted. He listed trends in vehicles including Mobility as a Service (MaaS), C-V2X Connectivity, self-driving fleets

and electrification, with GM's announcement of its all-electric future taking center stage.

Rohrbaugh added, "networked sensors, smart kiosks, data dashboards, and contact tracing are all areas to watch."

Immersive Media, Health Tech, Audio, 5G, and Brick & Mortar

In a live question-and-answer period Koenig and Rohrbaugh answered questions about technology trends not described in their earlier presentation on predictions for 2021. In answer to a question about what to expect this year from smart glasses, Koenig emphasized that, "this is definitely the year of augmented reality." But, he added, rather than describing experiences as VR, AR or MR, he said those terms will be replaced by describing "degrees of immersion."

Koenig added that, "people like these [VR] experiences but AR is really helpful in providing real-time information." Rohrbaugh, who had pointed to the use of Microsoft HoloLens' AR for medical uses, answered a question about the increased use of voice in smart home products. "Steve and I have described it as an 'ingredient' technology," she explained. "We are seeing



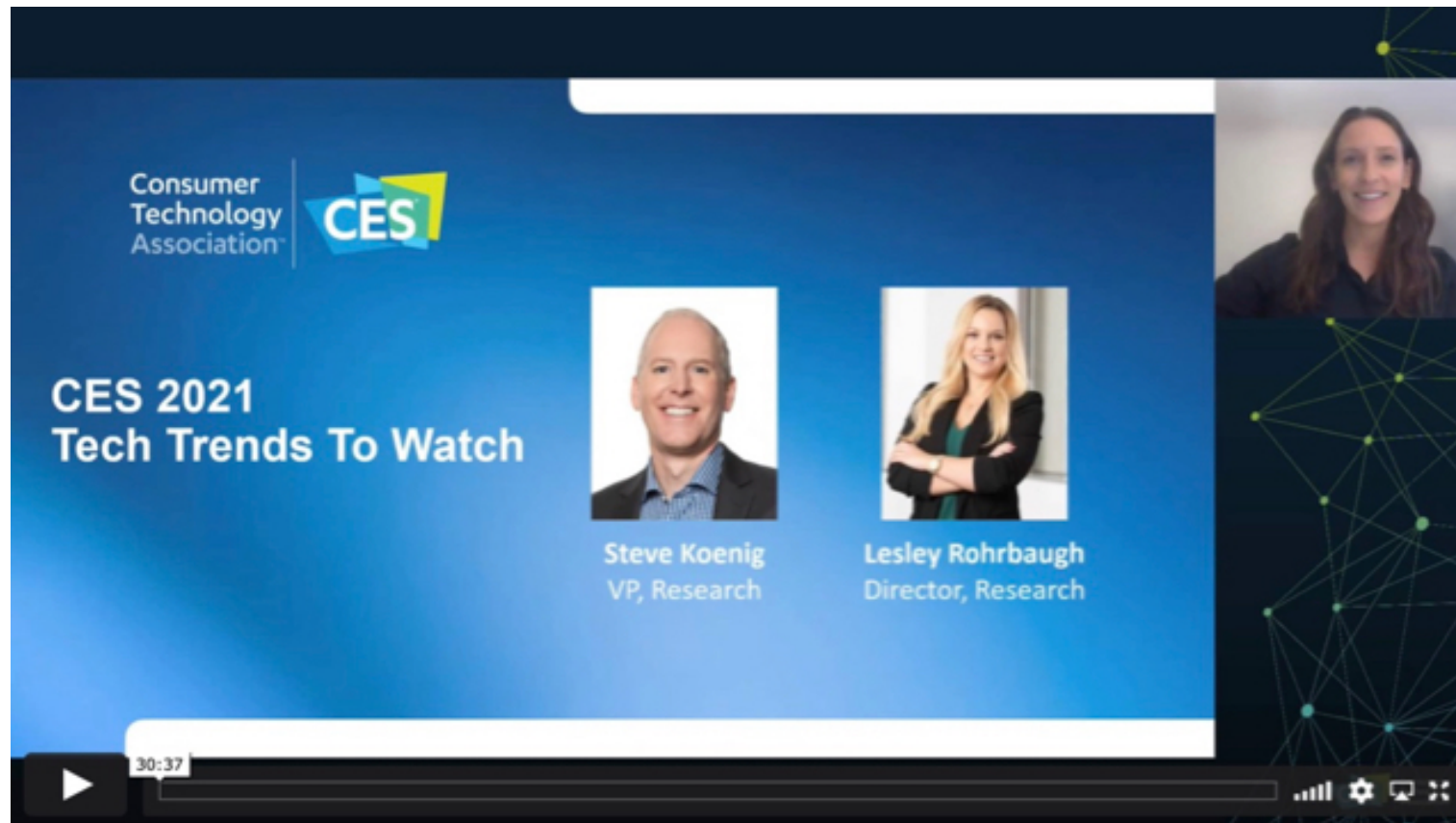
Razer's smart mask - CES 2021

this throughout every product category from vehicles to smart homes. And don't forget that audio and voice are also an integral part of AR and VR. Vehicle technology is one of the more interesting ways that voice will be used as an ingredient technology."

Remote learning is an area that has surged this last year and, said Koenig, "the innovations won't stop." "Even when we can finally get back to in-person

classrooms and training centers, online sessions will stay in place," he predicted. "In the future, it will extend opportunities, and school systems and universities will lean into them. It will be a real economic benefit for economies, educators, students."

In response to a question about the most interesting health technology this year, Rohrbaugh pointed to smart masks. "I think we'll see different versions of them," she



said. "Smart masks can track conditions around you including pollution, by sending notifications to your smart phone. We'll see this kind of consumer focus this week. I'm also excited about pet robots that are focused on assuaging anxiety for folks of all ages."

In response to the observation that nascent 5G has raised complaints of spotty coverage, Koenig noted that industrial IoT will "bring more antennas and ameliorate weak spots in the

network." "It takes time to build this out," he counseled, noting that 135 commercial 5G networks are up and running. He stated that 5G networks will soon be pushing beyond metropolitan areas. "In the next few years, 5G will overlay the entire digital economy," he promised.

Another question asked if CTA thinks COVID-19 will "accelerate shrinkage of brick-and-mortar." Rohrbaugh said that, rather than shrinking these companies,

technology is actually helping them "get products into customers' hands."

Koenig commented on TV technology at CES 2021. "We'll see more 8K displays, from LG, Samsung, HiSense," he said. "And OLED continues to gain momentum in European and Asian markets as well as the U.S., with more competition around price. Beyond that, we've already heard from LG in innovations in smart TV platforms including command and control with voice."

Audio streaming also has a strong future, said Koenig, who reported it is now a \$10+ billion industry with double-digit growth. "People are streaming audio content," he said. "And noise-canceling technologies sound better every year."

Keynote Summary

Despite its new virtual format, CES offered compelling keynote addresses by top executives from major companies such as AMD, Best Buy, General Motors, Microsoft, Verizon and Walmart who discussed plans for new products, services and business models, in addition to an array of changes underway designed to address a world facing a pandemic.

In its **press release**, CTA provided highlights of major CES keynote announcements, including:

Entertainment Transformed

Michael Kassan, chairman and CEO of MediaLink, and Ann Sarnoff, chair and CEO of WarnerMedia Studios and Networks Group, described the ever-evolving entertainment industry and what the industry will look like in a post-pandemic world. Maverick Carter, CEO of The SpringHill Co.; Adrienne Lofton, VP, North America Marketing, NIKE; and Deborah Wahl, Global CMO of General Motors, discussed how marketers and brands are adjusting and creating in today's landscape.

Future Reimagined

Michael Miebach, CEO of Mastercard, and Julie Sweet, CEO of Accenture, predicted tech trends they expect to see over the next decade.

Executives from major companies such as AMD, Best Buy, General Motors, Microsoft, Verizon and Walmart discussed plans for new products, services and business models.

AMD

Dr. Lisa Su, president and CEO of AMD, revealed the new Ryzen 5000 series mobile processors with two categories — the H-series, for laptops intended for gaming and content creation and the U-series, for ultraportable notebooks.

Microsoft

Brad Smith, president of Microsoft, gave his vision on ensuring cybersecurity and customer privacy protection, and discussed the tech industry's responsibility to exercise our conscience.

General Motors

Mary Barra, chairman and CEO of General Motors, launched new product lines from GM, including the Cadillac eVTOL, a concept air taxi; and a new business unit devoted to electrifying the goods delivery market.

Walmart

Doug McMillon, CEO of Walmart, discussed ways 5G, AI and robotics will change the business; how Walmart pivoted to keep employees healthy and customers satisfied; and the company's commitment to diversity and inclusion.

Best Buy

Corie Barry, CEO of Best Buy, shared how the company shifted during the pandemic and put the customer in control of buying, whether from home, curbside or in person.

ETC recommends the following related stories:

[CES 2021: WarnerMedia's Ann Sarnoff on Super-Serving Fans](#), MediaVillage, 1/13/21

[CES: WarnerMedia Chief Ann Sarnoff on Entertainment Shifts](#), ETCentric, 1/14/21

[CES: Microsoft Keynote on Promises, Responsibility of Tech](#), ETCentric, 1/15/21

[CES 2021: All of the Business Tech News You Need to Know](#), TechRepublic, 1/19/21

[CES: Brands Rethink Entertainment and Trends in Marketing](#), ETCentric, 1/14/21

[AMD's 7nm Ryzen 5000 Mobile Processors Promise 2021's Best Gaming Notebooks](#), The Verge, 1/12/21



Video Best Buy Keynote

[Best Buy CEO at CES 2021: 'Agnostically Meet the Customer Wherever They Are'](#), Retail TouchPoints, 1/15/21

[Walmart CEO Urges Companies at CES 2021 to Use Data to Reduce Racial Inequality](#), CNET, 1/13/21



Verizon Keynote



Walmart Keynote



GM and AMD Keynotes, Mark Cuban on tech in sport, and more.

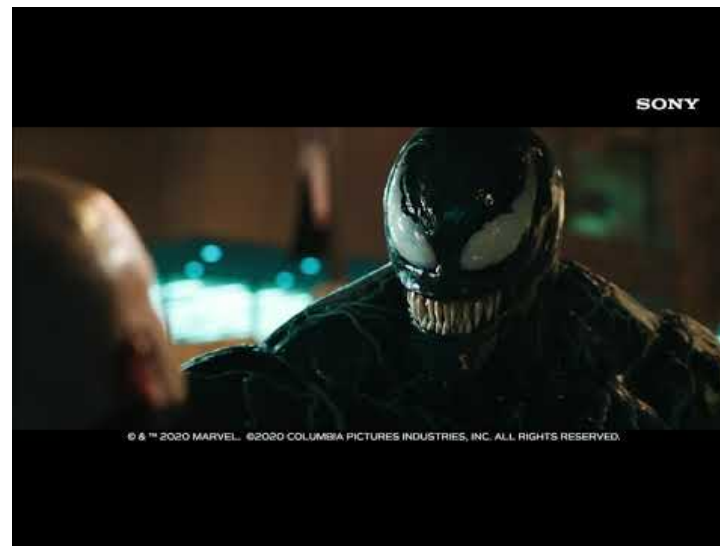


Microsoft Keynote

Adaptation

COVID-19

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*BOUNDLESS by Sony - 360 Reality Audio -
Creating Cinematic Sound at Home*



Crew In A Box - The world's first pro-quality, plug-and-play, remote production solution.

Change

ACCELERATION

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Senseglove New Nova VR Haptic Gloves

Snapback?

RETURN+

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LG OLED - 77-inch G1 4K



Samsung Micro LED 4K TV - 110-inch

Opportunity

A BETTER NORMAL

Mobility – 5G and Advances in Transportation Are Coming Fast, Faster Than Anticipated

Audience practice and expectations have been altered. Technological change has flooded in to meet needs and also suggests that the social change and device experience now forms a platform of experience innovation that can be an accelerated opportunity.



Samsung Digital Cockpit



LG OLED Cockpit Dashboard

Deloitte Consulting principal Dan Littman led an inquiry into how the 5G rollout fared in 2020, with AT&T Business chief executive Anne Chow and Qualcomm Technologies senior vice president of engineering Alejandro Holcman. “5G is a new-generation wireless technology filled with complexity of technology, ecosystems and government requirements,” said Littman. “And 2020 made everything a little more challenging.” He asked Chow and Holcman to describe how 5G has been challenged and/or accelerated during the year.

Chow pointed out that, “the importance and power connectivity was amplified this year, in terms of the tectonic shift to remote work and learning.” “Throughout 2020, we remained committed to our 5G deployment,” she said. “For the last two years, we’ve been working with enterprises across the country on use cases and innovations as we anticipated the rollout. I feel we sit in a stronger place today.”

Holcman said his company has also seen “an acceleration across the board.” “In terms of deliverables to OEMs, we have now, in addition to AT&T, more than 100+ operators worldwide that have commercially deployed 5G,” he said. “There are hundreds of OEMs with 5G products and shipments of millions of 5G devices, with no signs of slowing down.”

Littman noted that, “we’re still in the early stages of 5G.” That means that currently there is a lot of non-standalone 5G that relies on 4G,” he said. “In 2021, you’ll see lots more deployment of standalone

networks, which offer lots more capabilities and services.” Chow noted that everyone is still “in the early phases in terms of really understanding what the power of 5G will enable.”

“Some of our early adopters tend to be in industrial environments, where they are focused on their business transformation,” she said, noting that many digital transformations in 2020 “accelerated by five to 10 years — and 5G plays a material role in this.” Littman revealed a Deloitte report stating that, in the U.S., “we’ll have 40 to 160 devices per capita by 2030.” “We’re at four or five connected devices per person today,” he said.

Holcman reported that Qualcomm is currently in its third generation 5G platform, following the first 5G modem (X50) that made it a commercial reality for first-generation phones. The X55, which integrated with the Snapdragon 865, added capabilities. “I’m most excited about the **X60** and the **Snapdragon 888**,” he said. “That is really transformative with camera, AI, GPU and, very critically, low power,” which enables devices that require low power consumption.

Another key feature will be that the latest generation of 5G devices will be able to use any 5G band available and aggregate what’s available in low-band, mid-band and high-frequency bandwidths. “The availability of spectrum means the modem has to be able to combine these bandwidths,” he said.

Marketing

During a compelling CES 2021 presentation, MediaLink chair and chief executive Michael Kassan discussed how the past year has changed marketing with The SpringHill Company chief executive Maverick Carter, General Motors global chief marketing officer Deborah Wahl and Nike vice president of North America marketing Adrienne Lofton. “Staring through screens, you can lose connective tissue,” said Carter. “But we discovered you can still bring people together. Instead of jumping in the meeting, we had to talk about where we were at that day.”

According to Wahl, “the whole company changed its mode and focus of operation.” “That concern with each other that Maverick mentioned expanded and helped us get much closer to the consumer,” she said. “It also laser-focused our purpose and our collective future,” referring to the company’s all-electric future. Nike, a company known for its purpose-driven marketing, doubled down on that, said Lofton. “You can’t get to be purpose-driven unless you’re comfortable with being uncomfortable,” said Lofton. “A core value at Nike has always been, do the right thing and we believe sport has the power to change the world. If we began the conversation, we knew the competitors would follow.” In addition to building a “purpose playbook” for North America, Nike also got involved in a voter registration campaign.

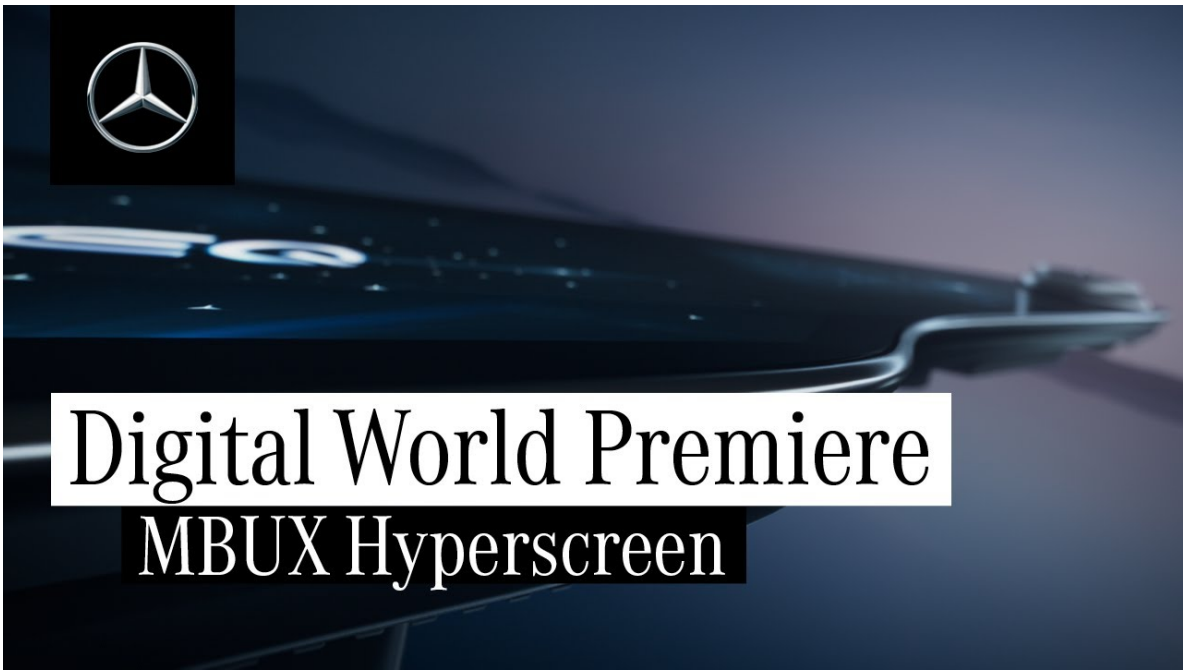
Carter believes that, “the job of the advertiser and marketer is going to change from selling things to keeping the consumer connected to the brand, by creating amazing content and telling amazing stories.” “The second thing they have to figure out is the distribution of that content, and the pandemic has really sped up [this conversation],” he said. “Last, content also has to say who you are as a brand.”

Lofton stated that, “the consumer wants content on demand,” which means marketers have to “understand real-time data and serve up the right body of content that is interactive as it is informative.” “It could be live workouts, which we launched for the first time,” she said. “Or it could be using our influencers like LeBron [James] or Travis Scott to tell a consumer what they’re thinking, because they’re stuck inside as well.”

“We have all seen a completely different way of engaging the consumer,” explained Wahl. “We used to do reveals of vehicles in presentation style, with all our corporate people explaining the technology. When we launched the Hummer EV, we partnered with Maverick and LeBron — we can come up with the next generation of entertainment. It’s the age of companies really filling the void we see out there in terms of entertainment.”

Carter and Lofton said that sports exemplified what can be done in this new media paradigm. Lofton pointed out “The Last Dance” documentary as “our reminder that sport is bigger than sport and when the world needs to be reinvigorated, sport is the reason.” Her team also launched the “Play Inside, Play for the World” campaign, which had tremendous consumer engagement.

The year has been one of “great transformation” for GM, noted Wahl. “This year was the one everyone in the company wanted to realize the zero crashes, zero emissions and zero congestion goals of our all-electric future.”



Hyperscreen Demo



LG OLED Cockpit Dashboard installed with Augmented Reality shown in 2021 Cadillac Escalade, now in market (top & bottom). [Learn more.](#)



Sony Vision S Dashboard





Samsung Digital Cockpit, a 49-inch QLED screen with a sound system that can be pulled up in front of a car's windshield to turn the vehicle into an office, gaming room or video recording studio.

CES: Samsung Intros New Version of Digital Cockpit for Cars

By Debra Kaufman

Samsung showcased its Digital Cockpit, a 49-inch QLED screen with a sound system that can be pulled up in front of a car's windshield to turn the vehicle into an office, gaming room or video recording studio. The concept was first introduced at CES 2018 and has been exhibited in an updated version every year since then. This year's Digital Cockpit was developed with Harman. Samsung stated that the 2021 Cockpit aims to "focus on simplifying communication and delivering fun on-the-go experiences." [More](#)



"The VoloCity, Volocopter's electric air taxi, is designed to meet the highest aircraft safety standards and features the lowest noise development in the industry. Volocopter developed the VoloCity specifically to meet growing demand for better intra-city mobility in large cities like Los Angeles, New York City, San Francisco, and Washington D.C. among others. These air taxi services would promote local job opportunities, save people time, and reduce costs associated with spending hours in traffic by simply flying over it. Furthermore, Volocopter's business plan aims to provide scalable air taxi services at costs comparable to regular taxi services." [More](#)

CES: Economic Council Chief Discusses Biden's Tech Goals

Consumer Technology Association president and chief executive Gary Shapiro held a conversation with the incoming Biden administration's designated director of the National Economic Council Brian Deese. In that position, Deese will advise President-elect Joe Biden on domestic and international economic policy and coordinate the administration's economic agenda. "Taking the vision and direction of the president and turning it into an action plan across all agencies is particularly important at times of economic crisis," he said. [More](#)

CES: Panel Examines Issues of Gender and Racial Bias in AI

During a CES 2021 panel moderated by The Female Quotient chief executive Shelley Zalis, AI industry executives probed issues related to gender and racial bias in artificial intelligence. Google head of product inclusion Annie Jean-Baptiste, SureStart founder and chief executive Dr. Taniya Mishra and ResMed senior director of health economics and outcomes research Kimberly Sterling described the parameters of such bias. At Google, Jean-Baptiste noted that, "the most important thing we need to remember is that inclusion inputs lead to inclusion outputs." [More](#)

CES: Seoul Robotics, Mobileye Enable Lidar for Smart Cities

Lidar (light detection and ranging) technology was presented as a key tool for building autonomous vehicles, smart homes and infrastructure for smart cities. Lidar, which senses what an object is based on its shape, first appeared in the 1970s but, up until now, has been too expensive and complicated for broad industrial use. Seoul Robotics, Intel's Mobileye and Blickfeld were among the companies at CES showcasing real-world lidar applications. Lidar is predicted to triple to an almost \$3 billion market by 2025. [More](#)

CES: Execs Consider Post-Pandemic Future of Remote Work

Darren Murph, head of remote for GitLab, was interviewed at CES 2021 by Joe Matthews, VP of purchasing & diversity officer at Gentex Corporation, on the future of remote work. Murph stressed the importance of communicating in ways that treat remote and in-house staff equally. It will be especially important if you reopen your office post-pandemic and allow people to continue working remotely to signal that you are committed to supporting remote work and not just "allowing" it. [More](#)

Sony Showcases Modular, Hi-Resolution Virtual Set Displays

Sony plans to sell modular “virtual set” displays similar to those used by Industrial Light & Magic and Epic Games to create the sets for “The Mandalorian.” The C-Series displays, which rely on MicroLEDs, will be part of its Crystal LED line aimed at the digital signage market. The modular panels can be connected to a controller. The B-Series displays will be marketed for use in movie production. According to Sony, they can operate at 1,800 nits. In comparison, Apple Pro Display XDR peaks at 1,600 nits.

The Verge reports that backgrounds created out of MiniLEDs are much more realistic and help “convince the audience that your actors are actually there.” Previous green-screen technology required actors to be lit as if the background existed but, with the modular displays, it is “easier to get a realistic-looking shot,” including reflections.

In its [press release](#), Sony reports the release of its “modular Crystal LED C-series (ZRD-C12A/C15A) with high contrast and B-series (ZRD-B12A/B15A) with high brightness.” Both displays, it adds, “are available in two pixel pitch sizes (P1.26mm and P1.58mm) to suit different installation needs and expand the line-up of Sony’s Crystal LED for various applications including corporate showrooms, lobbies and productions.”

Both come with the X1 for Crystal LED image processor, which “fully incorporates the LED control technology ... and the signal processing technology ... in Sony’s Bravia TV series ... [which provides] highly realistic large-scale imagery that maintains image integrity close-up and at a distance.” Other features include Reality Creation (maintaining high resolution with upscaling); Motionflow (artifact-free pictures without motion blur) and “showcase impressive gradation expression (22bit Super Bit Mapping).”

The displays operate with lower power consumption and offer front accessibility, equaling a “reduced total cost of ownership including maintenance, after purchase.” They are also both “fanless, ensuring quiet operation and feature a 100-240V AC power supply.”



Sony plans to sell modular “virtual set” displays similar to those used by Industrial Light & Magic and Epic Games to create the sets for “The Mandalorian.”

Technology for Good

Consumer Technology Association (CTA) president and chief executive Gary Shapiro and CTA executive vice president Karen Chupka helped kick off the 54th annual Consumer Electronics Show (CES) with an emphasis on how the technology industry has innovated in the face of a worldwide pandemic. “The last 12 months have been a challenge like no other for everyone in the world,” said Shapiro. “But technology has been a stabilizing, unifying force keeping us connected to schools, jobs, doctors, families and friends.”

Microsoft chief executive Satya Nadella joined the conversation to talk about this “unprecedented year, due to the pandemic.” “At the same time, I’m stunned by the level of economic activity and productivity and even social connection despite all these constraints,” he said. “We’re seeing broad adoption of digital technology in our lives.” He emphasized that, “the future of work will require lots more flexibility ... on how to collaborate, learn, and define well-being.”

Shapiro reported that CES 2021 features delegations from France, Hong Kong, Italy, Japan, Netherlands and South Korea. He also noted bipartisan support for 5G, bringing high-speed broadband to underserved and rural areas and the need for government to set rules on investment and deployment of autonomous vehicles.

“With a new administration in the White House, we hope to resume thoughtful, fact-based discussion about how technology is a force for good,” said Shapiro (click on the image above to watch the full presentation). “And while our industry needs reasonable guardrails so that tech companies know what’s legal and what isn’t, technology is a tool and we have the opportunity to use it for good.”

IBM global managing director and chief technology officer Bridget Karlin, who is also the new chair of the CTA Executive Board, focused on how artificial intelligence is poised to become an almost \$16 trillion global industry by 2030. “AI solved unprecedented challenges as a result of COVID,” she said, adding that it is being used to mitigate supply chain challenges among other tasks. “AI will be behind innovations to such problems as world hunger and ocean pollution. A multi-tiered AI interface can create new opportunities for learning and affordable education for students around the world. AI is solving the toughest problems of today and tomorrow.”

Shapiro described how, at CES 2020, CTA announced plans to invest \$10 million in funds that help to create more inclusive, diverse workforces. At CES 2021, he announced the latest investment went to women-owned [Plum Alley](#), a New York-based firm that invests in advanced technologies and medical breakthroughs. Plum Alley co-founders Deborah Jackson and Andrea Turner Moffitt described how they have invested \$32 million in 23 companies over the last five years.

Chupka announced the winners of the [World Bank Global Technology Challenge](#) unveiled at last year’s CES and aimed at “sustainable developed focused on healthcare, resilience and bridging the gender divide.” Out of 1,000+ applications, 15 companies were selected as finalists. Chupka revealed that [Butterfly Network](#) and [Tricog](#) were winners of the digital health challenge and [MicroMentor](#) by [Mercy Corps](#) won the gender challenge.

CTA is expanding its partnership with the World Bank to honor individual innovators, entrepreneurs and government officials that advocate for the advancement of tech in the developing world.

Megashifts Impacting Our World

Thomas Friedman, three-time Pulitzer Prize winning author and columnist for *The New York Times* discussed his latest thesis that the world has moved from the Industrial Revolution to a world that is “Fast, Fused and Deep.” During CES 2021, Friedman spoke with Professor Amnon Shashua, president and CEO of Mobileye, the Israeli subsidiary of Intel that develops autonomous and assisted driving AI solutions. Friedman framed the discussion by describing the Industrial Revolution as establishing “Walls” to govern the transfer of trade and human beings, a “Floor” as a social safety net to cushion people, and a “Ceiling” on the pace of change.

Political differences have led to debates regarding how strong the Walls should be, how thick the cushion on the Floor should be, and how high the Ceiling should be. However, Friedman suggests that three accelerators — technology, globalization and climate change — are blowing away the Walls, Floor and Ceiling and shooting us into the next era of Fast, Fused and Deep in the developing world.

“Fast” refers to when the half-life of skills gets shorter and shorter. The specific knowledge acquired at expensive traditional universities is out of date before the loans are paid off. In India, Infosys operates the world’s largest corporate university. Their goal

is to sustain the company and to continue to innovate by offering education to their employees that is both just-in-case and just-in-time.



Friedman, NYT columnist, 3-times Pulitzer Prize winning author, and Shashua, president & ceo, Mobileye ([Watch video](#))

“Fused” refers to new ways that business interests are becoming intertwined. For example, Qualcomm views Huawei in 5 ways — as a customer, supplier, partner, competitor and shared global standard-setter. Business relationships have become ecosystems of complex adaptive coalitions.

“Deep” refers to the trend of technology going deep inside our businesses, our lives and our bodies in ways that we may not even be aware of. Our smart home devices and activity trackers are often nodes on an information receiving and information sending network that we

may only vaguely understand.

As this Fast, Fused and Deep world emerges it will take an ecosystem of complex adaptive coalitions to develop protocols for operations and controls. To have a complex adaptive coalition you need to have shared values. How to establish shared values among people and machines is a key question hovering over the development of AI.

Shashua described how **Intel and Mobileye** have been working together for three years to find a way to code autonomous driving apps so they align with human judgement. Beyond traffic rules, how do we translate ‘be careful’ into code? How do you mathematically define for the machine the borderline between careful and recklessness? By extension, how do you show society that the AI’s judgement is aligned with human judgement?

Intel and Mobileye jointly published an academic paper titled **Responsibility-Sensitive Safety** to lay the groundwork for this. They plan to take it to regulators worldwide to start the regulatory discussion from an informed position.

Shashua pointed out that people often speak of ethics and AI, but they don’t often talk about alignment of judgement between people and AI. Alignment will cause the AI to act in accordance with the ethics of the community, regardless of the AI’s level of intelligence.

Our Fast, Fused and Deep world is transforming from Walls, Floor and Ceiling to radical openness. The three accelerators of technology, globalization and climate change mark the urgency of thinking about how to align the AI we develop with our own human judgement.

You can view the conversation at
<https://player.vimeo.com/video/500085593>

CES: Masks, Sensors, Robotics and Fitness in the COVID Era

As we continue to contend with a global pandemic that has led to numerous changes involving remote work and learning, telemedicine, home fitness, social distancing, online shopping, and more, it should come as no surprise that devices and services showcased at this year’s all-digital CES focused on a range of COVID-related issues. From high-tech masks designed to comfortably combat spread of the coronavirus and sensors that alert wearers of flu-like symptoms, to robots that disinfect work spaces with UVC light and televisions that take personal training to a new level, many companies touted wares for the COVID era consumer. **More**

CES: TV Technologies Takes Center Stage at Annual Confab

The demand for upgraded televisions and streaming content has increased significantly during the coronavirus pandemic. Nielsen reports that streaming services currently account for a quarter of all TV viewing in North America and, according to CES producer the Consumer Technology Association (CTA), consumers upgrading their TVs led to a shipment record for 2020, a trend expected to continue this year. In addition, an Ampere study indicates that the average U.S. household subscribes to four streaming services. CES 2021 showcased a compelling array of TVs and related tech, including 8K, QNED, MicroLED, MiniLED, NanoCell TVs, ATSC 3.0 (NextGen TV), Filmmaker Mode, transparent displays, enhanced game support and more. **More**

Wi-Fi 6E Certification Program Paves the Way for New Devices

The Wi-Fi Alliance began its Wi-Fi 6E certification program for devices built to transmit signals on the newly launched 6GHz band. Introduced just before CES 2021, the program comes in time to certify next-generation devices that can take advantage of the fastest speeds ever available with Wi-Fi. Wi-Fi 6, which began its rollout in 2019, adds access to the 6GHz band after the Federal Communications Commission voted unanimously to open it for unlicensed use. Until now, Wi-Fi use has relied on 2.4GHz and 5GHz bands.

CNET reports that, according to IDC research director Phil Solis, “Wi-Fi 6E will see rapid adoption in 2021 with more than 338 million devices entering the market, and nearly 20 percent of all Wi-Fi 6 device shipments supporting 6GHz by 2022.” “This year, we expect to see new Wi-Fi 6E chipsets from several companies, and a variety of new Wi-Fi 6E smartphones, PCs and laptops in the first quarter of 2021 followed by TVs and VR product announcements midyear,” he added.

The Wi-Fi Alliance incorporated Wi-Fi 6E standards into Wi-Fi Certified 6 to ensure that “new 6E devices stay secure and fully interoperable, regardless of region or manufacturer.”

“Consumers take it on faith that if you go buy a Wi-Fi device, it’s going to connect to your router,” said Wi-Fi Alliance spokesperson Kevin Robinson. “The reason that is in fact the case is because of Wi-Fi Certified. The industry puts a lot of value in getting devices through that testing so that the end experience is that everything works together.”

Wi-Fi Certified also “focuses on standardizing security protocols,” requiring, for example, that Wi-Fi 6E devices “support the latest protocol, WPA3, which promises better defense against attempts to brute force your network’s password, among other improvements.” Robinson noted that this is “an opportunity for a clean break from the legacy requirements of the 2.4 and 5GHz bands.”

Many industry members of the Wi-Fi Alliance who will showcase Wi-Fi 6E devices at CES 2021 praise the move. “Wi-Fi Alliance certification programs are essential to ensure confidence around Wi-Fi device interoperability,” said Intel’s Eric McLaughlin, VP of the Client Computing Group and GM of the Wireless Solutions Group. “New Wi-Fi 6E capability represents one of the single most important advancements in recent wireless history and is critical to helping address the growing demand for capacity, broadband access, and new usages.”

CNET predicts that one of the first Wi-Fi 6E phones we’ll see on the market will likely come from Samsung, “an early adopter of Wi-Fi 6 with its Galaxy S10 lineup.” Samsung Electronics vice president and Convergence R&D Group head JM Choi said, “we were among the very first to offer Wi-Fi Certified 6 products ... [and we] look forward to introducing new Galaxy devices able to take advantage of the increased speeds, reduced latency and expanded bandwidth that comes with connecting to frequencies in the 6GHz band very soon.”



The Wi-Fi Alliance incorporated Wi-Fi 6E standards into Wi-Fi Certified 6

Tech-Driven Solutions for Fan Safety and Engagement

Conference Session

Speakers: Dan Kaufman, SportTechie; Natara Holloway, NFL; Russ Simons, Venue Solutions Group

The COVID-19 pandemic created immense challenges for the entire world in 2020. The sports industry was forced to postpone, shorten and cancel seasons. Venue operators were restricted to hosting events with fans at limited capacity or without them entirely. The resulting environment created opportunities to accelerate new innovations, from creative fan engagement methods, to improvements in safety and efficiency at venues across the globe. Examine the challenges the sports industry faces and how technology will lead the way into 2021 and beyond.



Groundbreaking Virtual Performance to Showcase Songs from Singer Songwriter's Highly Anticipated Epic Records Debut Album, Life Support

Next Generation Television in Focus

Conference Session

Speakers: Michael Davies, Fox Sports; Grace Dolan, Samsung Electronics; Madeleine Noland, ATSC

With the advent of 8K Ultra HD and NextGen TV, a revolution in TV is coming, and with it will come advanced display technologies giving consumers a taste of truly immersive viewing experiences. How are consumer expectations going to change and how are leading manufacturers aiming to meet — and even exceed — those expectations?



5G Acceleration: Tomorrow is Today

Trends in Mobility

Elemental Content co-founder John Penney moderated a conversation with Samsung Electronics America vice president of product management Drew Blackard and Ice Mobility co-founder and chair Denise Gibson on trends in mobile communications. “The 5G new wireless ecosystem offers a lot of applications in business environments,” Penney noted, asking Blackard and Gibson to describe some of what they think will be the most compelling use cases as 5G continues its rollout of networks and devices.

Blackard opined that, “there are two buckets of 5G use cases.” “The first is the ‘better on 5G’ cases and, as more infrastructure develops the ‘only on 5G’ experiences,” he said. Samsung’s recent partnership with Google to build out full HD video chat for 5G



devices and Samsung’s collaboration with Microsoft for Xbox cloud gaming are in the first bucket.

In the second bucket, he pointed to Samsung’s recent partnership with AT&T and the Dallas

Cowboys to build an **augmented reality in-stadium experience**. “You’ll see more and more of these types of experiences going forward,” he predicted.

Gibson stated that implementing 5G is not simply about geography. “It’s also about the evolution of what we’ll be able to do with it when

it becomes pervasive and we further build out its capabilities for device engagement,” she said. “The lack of latency will cause so many more real-time data applications to be deployed.” Blackard agreed, noting Samsung believes that when 5G’s speed, latency and bandwidth come together, the “incredible new use cases” will be enabled.

Penney emphasized the importance of partnerships among carriers, device manufacturers, entrepreneurs and others to bring 5G forward. Gibson pointed out that, “over time, it’s going to be far more cost effective for carriers to have individuals and businesses and devices on 5G than the prior platforms.”

“The aspects of real-time data to the mobile device is going to drive so many devices that, through various types of connectivity, there’s going to be a number of players that today and will continue to come into the space, driving all kinds of unique peripherals,” she said.

Blackard reported that Samsung already has “very tight collaboration with our carrier partners and that takes a lot of planning and co-investment and coordination.” He singled out “interesting use cases around edge computing primarily driven by 5G.” “It will all be driven by partnerships,” he said.

Penney added that, although there are roughly 9 billion connected devices out there, we don’t yet have the infrastructure to handle everything 5G can impact, such as self-driving cars and smart

cities. “This is a quantum leap forward in evolving opportunities,” he said.

With regard to a question on exciting use cases, Gibson noted that Ice Mobility built “the first fully functional 5G warehouse, partnered with Verizon and Microsoft, at our primary warehouse in Chicago.”

Blackard focused on accessibility, especially due to the COVID-19 lockdown. “Applied to 5G as it builds out, parts of the country will be getting broadband speeds for the first time,” he said, noting that Samsung is “pushing for 5G at accessible price points,” including a new 5G phone for under \$500.

CES: Acceleration of Technology, Adoption in 5G’s First Year

Deloitte Consulting principal Dan Littman led an inquiry into how the 5G rollout fared in 2020, with AT&T Business chief executive Anne Chow and Qualcomm Technologies senior vice president of engineering Alejandro Holcman. “5G is a new-generation wireless technology filled with complexity of technology, ecosystems and government requirements,” said Littman. “And 2020 made everything a little more challenging.” He asked Chow and Holcman to describe how 5G has been challenged and/or accelerated during the year.

Chow pointed out that, “the importance and power connectivity was amplified this year, in terms of the tectonic shift to remote work and learning.” “Throughout 2020, we remained committed to our 5G deployment,” she said. “For the last two years, we’ve been working with enterprises across the country on use cases and innovations as we anticipated the rollout. I feel we sit in a stronger place today.”

Holcman said his company has also seen “an acceleration across the board.” “In terms of deliverables to OEMs, we have now, in addition to AT&T, more than 100+ operators worldwide that have commercially deployed 5G,” he said. “There are hundreds of OEMs with 5G products and shipments of millions of 5G devices, with no signs of slowing down.”

Littman noted that, “we’re still in the early stages of 5G.” That means that currently there is a lot of non-standalone 5G that relies on 4G,” he said. “In 2021, you’ll see lots more deployment of standalone networks, which offer lots more capabilities and services.” Chow noted that everyone is still “in the early phases in terms of really understanding what the power of 5G will enable.”

“Some of our early adopters tend to be in industrial environments, where they are focused on their business transformation,” she said, noting that many digital transformations in 2020 “accelerated by five to 10 years — and 5G plays a material role in this.” Littman revealed a Deloitte report stating that, in the U.S., “we’ll have 40 to 160 devices per capita by 2030.” “We’re at four or five connected devices per person today,” he said.

Holcman reported that Qualcomm is currently in its third generation 5G platform, following the first 5G modem (X50) that made it a commercial reality for first-generation phones. The X55, which integrated with the Snapdragon 865, added capabilities. “I’m most excited about the X60 and the Snapdragon 888,” he said. “That is really transformative with camera, AI, GPU and, very critically, low power,” which enables devices that require low power consumption.

Another key feature will be that the latest generation of 5G devices will be able to use any 5G band available and aggregate what’s available in low-band, mid-band and high-frequency bandwidths. “The availability of spectrum means the modem has to be able to combine these bandwidths,” he said.

Quantum Computing

Two CES 2021 panels addressed the current state and anticipated advances in quantum computing, which is already being applied to problems in business, academia and government. However, the hardware is not as stable and robust as people would like, and the algorithms are not yet up to the task to solve the problems that many researchers envision for them. This has not stopped entrepreneurs, major corporations and governments from dedicated significant resources in R&D and implementations, nor from VCs and sovereign funds making major bets on who the winners will be.

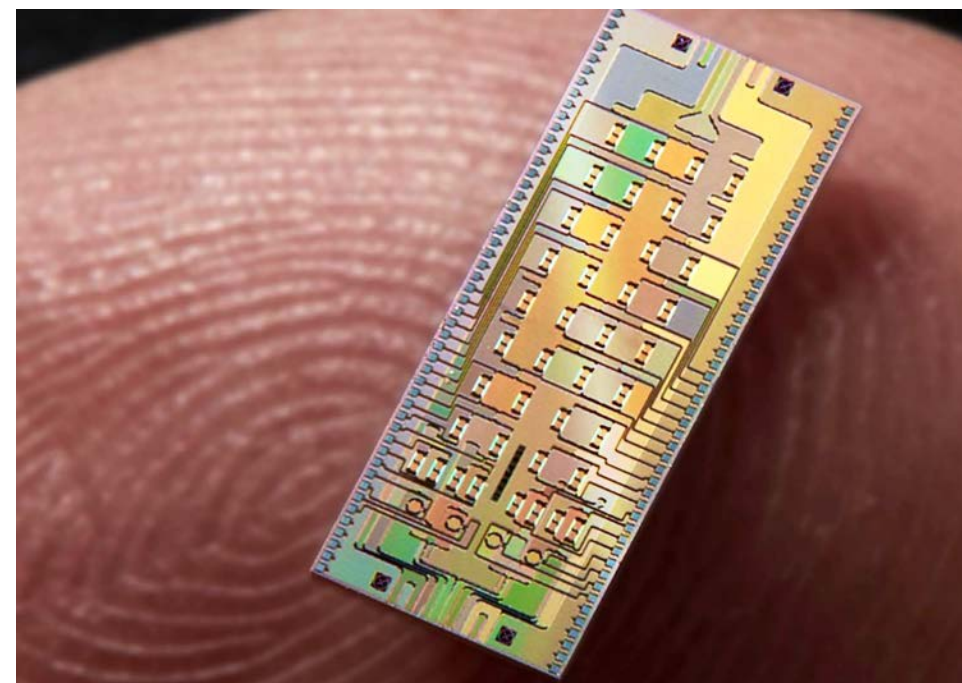
One panel, titled “AI and Quantum Cyber Disruption,” was a discussion with Dr. Vikram Sharma, founder and CEO of [QuintessenceLabs](#) in Australia, and Pete Tortorici, director of joint information warfare at the DoD [Joint Artificial Intelligence Center](#).

The other panel was titled “Quantum Computing — Making it Real,” and was an energetic discussion between Dr. Joseph Broz, executive director of the [Quantum Economic Development Consortium](#) (QED-C); Katie Pizzolato, director of [IBM](#)

[Quantum Strategy and Applications Research](#); and Dr. Eleanor Rieffel, senior research scientist and Quantum Artificial Intelligence Laboratory lead at the [NASA Ames Research Center](#)

Sharma declared that we are in the second phase of the quantum portion of the fourth industrial revolution. The fourth industrial revolution is driven by the confluence of AI, 5G, robotics, autonomous, immersive media, and IoT. The first phase of the quantum portion involved passively harnessing quantum effects. The second phase, of which we are now on the cusp, involves engineering quantum states and effects that don’t exist in nature, similar to leap required in materials science to make super-materials. By manufacturing these quantum effects, we are opening up a whole host of new capabilities in computing, imaging, sensing and cybersecurity.

QuintessenceLabs is focused on the cybersecurity piece. Quantum computing can protect against breaches. Planning a



Xanadu Quantum Hardware

quantum implementation can also help the organization think about what a quantum-safe security posture would look like. The general consensus is that a cybersecurity adversary with quantum capabilities will appear within 5-10 years. This will particularly impact public and private key encryption.

NASA Ames’ Rieffel pointed out that the [National Institute of Standards and Technology](#) (NIST) has already recommended larger key sizes in response

to quantum development, regardless of what the quantum approach ends up being. For online transactions, symmetric key encryption is relatively safe against quantum crypto, but she agreed that public key encryption is easily cracked by it.

QED-C's Broz said that companies can start planning immediately for quantum security. He noted that ex-Google head Eric Schmidt said at a conference last week that companies need to start thinking about quantum security now.

We have not yet seen a 'near peer' use AI in an attack, DoD's Tortorici added, but it is a known and expected threat. He pointed out that AI can both build distrust into crypto systems and breach systems.

QuintessenceLabs is working on 3 areas: 1) using quantum to generate true random numbers, 2) having very good key management to handle hundreds of millions of keys as we move to a highly encrypted IoT world, and 3) the frontier world of quantum key distribution.

Discussing the fundament infrastructure, Rieffel said that the hardware needs to be much more robust and fault-tolerant to do something useful. If what you really want is certified random numbers you may be in luck in the next couple years, but if you want to do materials science simulations or optimization, it will be a longer wait. She added that what we learn about quantum algorithms has often fed into classical algorithms. Quantum has inspired better classical algorithms.

One business application for quantum computing, said Broz, is a situation where it can solve critical and difficult problems, unlock new potential in markets, and then businesses can calculate their

increased revenue potential and the return on that quantum investment. IBM's Pizzolato added that the IBM cloud-based approach is perfect for driving that value chain.

Pizzolato explained that quantum computing will only be good for a certain subset of problems. It should be integrated into traditional workflows so it is in concert with its classical computing counterpart. Rieffel added that the front-end programming is the same as traditional computing. The virtual infrastructure in the cloud can look at the code and determine if it should be routed to a quantum or a traditional computer.

Sharma and Tortorici were asked what recent development in their field stands out and impresses them.

Sharma said that in December 2019 Chinese researchers came up with a solution within minutes to Gaussian Boson Sampling (GBS). In 2011, MIT professors posed the problem, saying that solving it would demonstrate quantum advantage. The same problem would take 2.5 billion years to solve on a supercomputer.

Tortorici mentioned the **DALL-E application** on OpenAI GPT-3. The application can create a picture in the style of Salvador Dali from a string of words. It appeared to be able to ascribe context to the words. It even knew how to draw the shadows for the images. That level of inference is of high interest to his team for tactical military applications, he noted.

The moderator asked what do you expect to see in the next year.

Broz made three predictions: 1) there will be a cloud-based demonstration of quantum supremacy this year that will validate useful algorithms, 2) there will be big strides in translating customer

problems into quantum algorithms, and 3) there will be leaps in middleware development in the next year.

Rieffel anticipates exciting advances in hardware and algorithms, but she doesn't expect those advances to translate into significant improvements in the applications. Also, she doesn't see the hype around what company will "win" quantum computing going away.

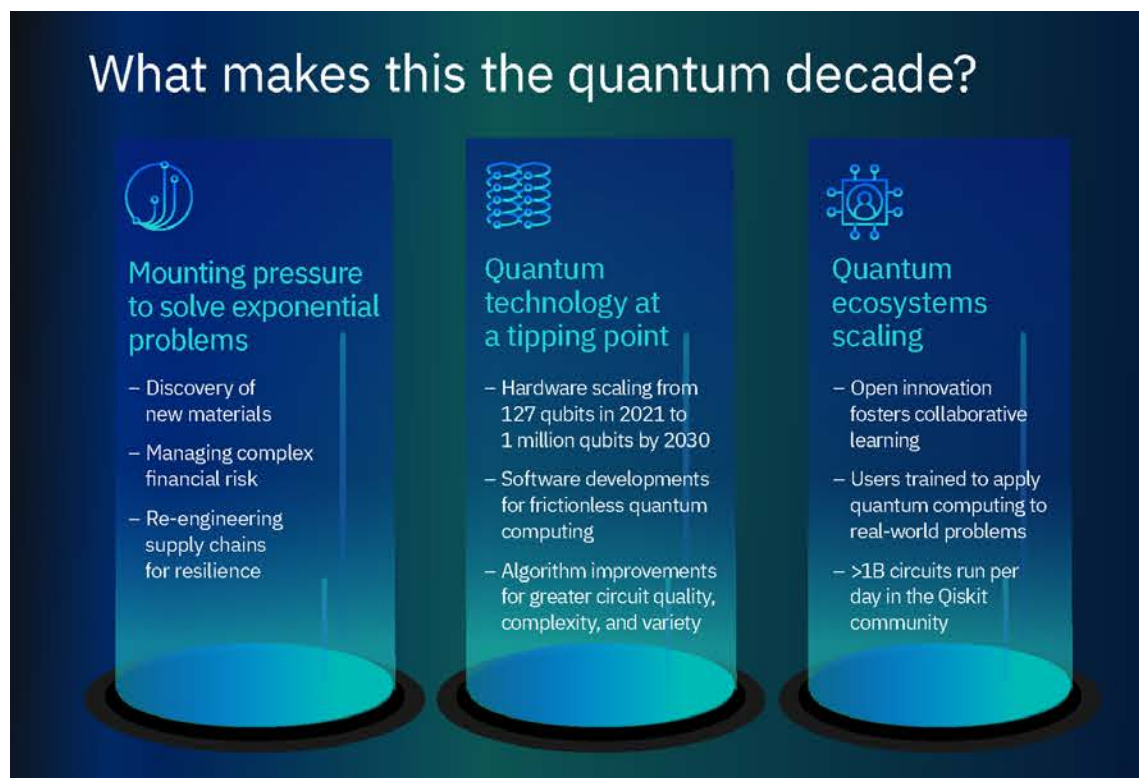
Pizzolato thinks that rapid advancement in use will spur a lot of software tool development. "I would be surprised and pleased if there were meaningful advances in correcting the errors in these systems," she said, referring to Rieffel's earlier comment that the systems need to be more robust, stable and fault-tolerant.

CES: Industry Experts Discuss the Cryptocurrency Landscape



Cryptocurrency entrepreneurs convened in early December to record The Cryptocurrency Landscape session for CES 2021. Panelists discussed how Wyoming has established legal and regulatory protocols for Bitcoin to make cryptocurrency activities compatible with existing banking regulations. They also discussed how institutions and businesses are getting more comfortable with cryptocurrency investments, how online payment services such as PayPal and Venmo have added Bitcoin to their transaction options, and how cryptocurrency's provable scarcity makes it more attractive to investors and the general public as countries issue more currency to prop up their economies during the COVID shutdown.

The session was moderated by Michael Casey, chief content officer of [CoinDesk](#). Panelists included Catherine Coley, CEO of [Binance.US](#); Jeanine Hightower-Sellitto, CEO of [Atomyze LLC](#); Caitlin Long, founder



IBM Suggest 2021-2030 as the Quantum Decade. For more on Quantum Computing at CES 2021 see [page 39](#)

and CEO of **Avanti Bank & Trust**; and Matthew Roszak, chairman and co-founder of **Bloq, Inc.**

Casey set the stage by declaring that we are at a turning point globally. Massive money issuance by governments to sustain economies during COVID will drive a financial reckoning when it is over. China is developing its own national digital currency to work within the country's financial system. Many large financial institutions have in-house initiatives to explore this huge emerging business opportunity. He asked the group, how is the infrastructure needed for cryptocurrency adoption in the U.S. shaping up?

Long, of digital asset bank Avanti, discussed how she and others have been working with the Wyoming state government to build out a new regulatory framework. "We need bridges to go between traditional banks and the digital bank," she said.

The protocol layer of the legal system that regulates Bitcoin must be backwards compatible with traditional banking, so that fund managers with fiduciary obligations can include it in their portfolios. She said that they have achieved that in Wyoming, and the new type of bank charter that Wyoming adopted is now being shopped nationally.

Coley added that U.S. consumers need easy-access, low-fee, and simple cryptocurrency transaction opportunities. As of early December, cryptocurrency trading app Binance.US is delivering that in 42 states.

Hightower-Sellitto explained that the commodity tokens that Atomyze deals with are tied to specific physical assets via the blockchain (example: a specific ton of iron ore or coal). Blockchain

solves the titled ownership and transferability problem. Ethical extraction and transfer can be documented and tracked.

Roszak explained that as these developments in cryptocurrency move forward in the U.S. and globally, and as the "career risk" fades for financial managers, there will be more institutional investing. PayPal, Venmo, Square and Robinhood all have crypto as an option. That is a really powerful way to bring on consumers. He said that we will go through an onboarding of crypto worldwide over the next decade. He expects a central bank somewhere to start investing in cryptocurrencies within the next year.

Casey asked the panel to look into their crystal ball and say something about crypto's future. Long mentioned two things: that you can directly control your asset by storing it yourself off of your exchange, and that unlike government-issued currency your crypto asset is provably scarce. Hightower-Sellitto expects that many large banks and institutions will start offering cryptocurrency services, adding that she suspects none of them wants to be first.

Coley has seen an acceleration of adoption while we've been locked down, and she expects a surge of activity as the world opens up post-pandemic to business and travel. Finally, Roszak foresees a massive goldrush in crypto and Bitcoin.

Since this panel was recorded, Bitcoin has moved from the then all-time high of around \$20,000 to surpass \$50,000 in February 2021.

Television and Streaming

CES: TV Technologies Takes Center Stage at Annual Confab

The demand for upgraded televisions and streaming content has increased significantly during the coronavirus pandemic. Nielsen reports that streaming services currently account for a quarter of all TV viewing in North America and, according to CES producer the Consumer Technology Association (CTA), consumers upgrading their TVs led to a shipment record for 2020, a trend expected to continue this year. In addition, an Ampere study indicates that the average U.S. household subscribes to four streaming services. CES 2021 showcased a compelling array of TVs and related tech, including 8K, QNED, MicroLED, MiniLED, NanoCell TVs, ATSC 3.0 (NextGen TV), Filmmaker Mode, transparent displays, enhanced game support and more. [More](#)

Survey Reveals U.S Viewers Adding More Streaming Services

During the COVID-19 pandemic, an increasing number of streaming media services have thrived and, according to a J.D. Power survey, Americans now subscribe, on average, to four streaming services, up from three when the pandemic began. That translates to 24 percent more in subscription fees, for an average consumer outlay of \$47 per month in December, up from \$38 in April. Netflix and Disney+ have surged, and newcomers HBO Max and Peacock have also done well. Apple wants to boost its Apple TV+ service but may find itself at a disadvantage. [More](#)

If The Stream Works, The Dream Works: Streaming TV

Nielsen's SVP of product strategy shares new insights into the flourishing landscape of streaming media. As streaming has increased its share of the consumer viewing menu, the content, applications and distribution paths have become unique and unexpected. Nearly every player in the media industry—from platforms to studios to talent—needs trusted data to fully comprehend the burgeoning behavior of the streaming consumer. In this session, Fuhrer dove deep into these insights, revealing how theatrical movie releases on streaming have altered the way films are distributed and uncovered the top streaming trends of 2020!

[Session Recap](#)

CES: Identifying Consumer Trends Shaping the New Normal

The Harris Poll's CEO John Gerzema and Mastercard's EVP of North America marketing and communications Cheryl Guerin presented data from their recent joint market research study of COVID-19's impact on digital commerce. They grouped their findings around four key trends: The Touchless Revolution, The Betterment Boom, The Rise of Revenge Spending and The Uncalendared Year. The presentation was followed by a 30-minute discussion with panelists Julia Hammond of MDC Partners, DyShaun Muhammad of Uber, Lou Paskalis of Bank of America and Katie Riccio Puris of TikTok. [More](#)

CES: Sony Integrates Movie Streaming to Promote Bravia TVs

Sony announced during CES 2021 that its new line of Bravia XR television sets would provide consumers with the Bravia Core platform for streaming select movies from Sony Pictures Entertainment. The company indicates that its Pure Stream tech enables “near lossless” ultra high-def Blu-ray Disc quality. The Bravia Core platform comes pre-loaded on new Bravia XR models including Sony’s 8K LED, OLED and 4K LED models. Access to film titles is based on a type of voucher system in which customers are given credits depending on which Bravia XR model is purchased. [More](#)

Struum to Aggregate Content from Many Streaming Services

Co-founded by former Discovery and Disney executives, Struum is a new entrant to the streaming space that, rather than offering its own content, instead hopes to find a niche in helping viewers manage the flood of content available from hundreds of streaming services. It will provide viewers á la carte access to shows and movies without having to subscribe to each platform, giving visibility to smaller services. Former Disney chief executive Michael Eisner’s The Tornante Company is Struum’s main financial backer. [More](#)

Municipalities Want Streaming Services to Pay Franchise Fees

As streaming media services increasingly resemble cable bundles, more towns and counties are looking to regulate them. In Georgia for example, three municipalities filed a federal lawsuit against Netflix, Hulu and other services for as much as 5 percent of their gross revenue in an attempt to treat them as cable services. According to the lawsuit, Netflix earned about \$103 million over the recent five years from subscribers in Gwinnett County, Georgia. If treated as a cable provider, that would represent \$5.15 million in retroactive fees. [More](#)

CES: Sony, TCL Televisions Will Feature Streamer Google TV

During CES 2021, Sony revealed its latest televisions will run Google TV, that company’s newest streaming system. TCL also stated that Google TV would be available in its sets in the U.S. Google TV succeeds Android TV, which can be found on some devices in the U.S., including the Nvidia Shield, TiVo Stream 4K and smart TVs from Sony, Hisense and TCL. Sony added that it had “no concrete plans” to update older Sony TVs running Android TV. TCL said it planned to integrate Google TV in its 8K and MiniLED sets as well as HD and 4K models. [More](#)

Sony Promotes Glasses-Free 3D Spatial Reality Display

Sony first teased its Spatial Reality Display at last October's CES Unveiled Conference. Experts have alternately described the experience as taking 3D to the next level, virtual reality without the headset and, simply, mind-blowing. In essence it relies on Sony's Eye-Sensing Light Field Display (ELFD) technology to create an experience somewhere between virtual reality and next-gen 3D. The Spatial Reality Display was named a CES 2021 Innovation Awards Honoree. A shipping product, the display's suggested retail price is \$4,999.99. [More](#)

Samsung's New MicroLED TVs Offer Improved Contrast

Samsung debuted MicroLED TVs during last week's virtual CES 2021, all offering 4K resolution, in fixed sizes of 110-inches, 99-inches and 88-inches, with the 110-inch version priced at \$156,000. That compares to the launch at last year's CES of the 292-inch MicroLED TV, made up of individual modules and custom-installed. In comparison, Samsung's 98-inch 8K TV, which uses LCD-based QLED display, is priced at \$60,000. MicroLED, the first new screen technology in 10 years, is closer to OLED than LCD and is said to feature improved contrast and response time. [More](#)

LG Unveils Evo OLED Display with Improved Brightness

LG Electronics introduced Evo, its high-end OLED TV that features greatly improved light output. OLED TVs offer superior picture quality to LCD TVs, as each pixel can turn on and turn off its own light. But OLED TVs offer half that of the brightest LCD TVs, hobbling the overall picture quality. This year, LG's Evo and Sony's new OLED TVs offer more brightness. In addition to LG, only Sony and Vizio sell OLED TVs, all produced by LG Display. During CES, LG also showcased new QNED Mini LED and NanoCell TV models. [More](#)

Panasonic Debuts New OLED TV with Surround Sound

Panasonic unveiled its flagship JZ2000 OLED TV, following last year's HZ2000 4K OLED TV. Both feature support for Dolby Vision and HDR10+ but the JZ2000 now supports "ambient-aware" versions of both formats — Dolby Vision IQ and HDR10+ Ambient — which adjust HDR brightness in response to light levels around the TV, especially useful for daytime viewing. The Panasonic JZ2000 also features 360° Soundscape Pro, which supports side-firing speakers for Dolby Atmos, resulting in better support of multidirectional sound. [More](#)

CES: New Sony and LG TVs Support the ATSC 3.0 Standard

ATSC 3.0, the IP-based broadcast television standard created to improve viewing across future fixed and mobile devices, had a presence at CES 2021 in the form of new technologies and TV sets. Sony, LG and BitRouter were among the companies debuting NextGen TV tech at this year's show. Sony's Bravia XR line of LED and OLED sets is ATSC 3.0 compatible, as are LG's new 4K and 8K UHD TVs. BitRouter introduced a new Linux-based ATSC 3.0 receiver and the company's ZapperBox ATSC 3.0 set-top box, which will be available for licensing by other brands. [More](#)

Sony's Cognitive Processor Tech Comes to Next-Gen TV Sets

Sony Electronics debuted the Cognitive Processor XR, a new type of image processor that will be incorporated in its new Bravia XR LED and OLED TVs. According to Sony Electronics president and chief executive Mike Fasulo, the new processor surveys the entire frame in real time, breaking down specific zones to concentrate on — such as realistic skin tone — as a way to mimic how our brains process images. Sony global display and processor expert Kazuo Kii says the Cognitive Processor XR will aid the TVs' 8K performance. [More](#)

CES: The Frame TV From Samsung Can Rotate Its Orientation

During CES 2021, Samsung showed upgrades to The Frame, a so-called "lifestyle TV lineup" first introduced in 2017. The Frame now offers a thinner frame and can rotate to landscape and portrait orientations. Last year, Samsung showcased The Sero, its first rotating television, that was social-media friendly and doubled as a smart art display. A more elegant and slimmer version, The Frame is a 43-inch, top-of-the-line model. Netgear's popular Meural Canvas smart art frames also swivel to offer both landscape and portrait views. [More](#)

CES: LG Presents 48-Inch 'Bendable' OLED Gaming Monitor

LG Display demonstrated "the world's first" 48-inch, bendable, 4K gaming monitor during CES 2021. According to LG, the monitor's thin OLED screen features a curvature radius that allows it to bend up to 1,000 mm without impacting the display's functionality. The company's Bendable CSO (Cinematic Sound OLED) display is designed to serve as a traditional flat screen for watching television and easily convert to a curved screen for a more immersive gaming experience. The display also includes tech that enables it to vibrate and create sound without speakers. [More](#)

CES: Rollable Tech Helps Mobile Devices Change Dimensions

During CES 2021, LG provided a peek into its LG Rollable, the company's first phone that transforms between smartphone and tablet form factors. One company executive said the LG Rollable — positioned as a strong alternative to existing foldable phones — will debut sometime this year. Meanwhile, TCL is developing a device based on the same approach, but the company reported it is only at the conceptual planning stage. But both LG and TCL did leak some information about the upcoming devices' specifications. [More](#)

CES: Sony Promotes Glasses-Free 3D Spatial Reality Display

Sony first teased its Spatial Reality Display at last October's CES Unveiled Conference. Experts have alternately described the experience as taking 3D to the next level, virtual reality without the headset and, simply, mind-blowing. In essence it relies on Sony's Eye-Sensing Light Field Display (ELFD) technology to create an experience somewhere between virtual reality and next-gen 3D. The Spatial Reality Display was named a CES 2021 Innovation Awards Honoree. A shipping product, the display's suggested retail price is \$4,999.99. [More](#)

CES: Airpeak Drone Designed for Capturing Photos and Video

First announced in November of last year, Sony unveiled a drone at CES 2021 that the company says is the smallest of its kind capable of accommodating a Sony Alpha mirrorless camera for professional photography and producing video projects. While Sony did not reveal pricing or specs, the drone is said to be shipping sometime this spring. The quadcopter design shown during the all-digital CES featured two landing gear extensions that are designed to retract during flight so they do not get in the way of shooting stills or video. [More](#)

CES: Panasonic, Illuminarium to Create Immersive Spectacles

During CES 2021, Panasonic System Solutions Company of North America and Atlanta-based Illuminarium Experiences announced a partnership to use the former's laser projectors to create "massive entertainment spectacles." Panasonic will be the exclusive provider of native 4K projectors, 4K professional displays and 4K professional camera solutions for Illuminarium Experiences' custom-designed 360-degree immersive entertainment centers dubbed "Illuminariums." The spectacles are aimed to create "communal, connective entertainment." [More](#)

CES: Advertisers Need Better Measurement to Embrace OTT

Advertising on Connected TV (CTV), otherwise known as Over-the-Top (OTT), is a hot topic for advertisers who want to get their messages on any device, including TVs that can be connected to the Internet. According to eMarketer, upwards of 40 percent of the world's population are "digital video viewers." But advertising on CTV has enough pitfalls to discourage marketers from embracing it. During a CES 2021 session, DoubleVerify chief executive Mark Zagorski and chief product officer Jack Smith enumerated the challenges and proposed solutions. [More](#)

MOTION SIMULATOR FOR THE HOME



YAW, billed as the world's most compact and affordable virtual reality motion simulator adds dynamic motion to games and VR experiences. The product was initially funded on Kickstarter. This video shows gameplay from *Star Wars Squadrons*. For info on YAWVR: <https://www.yawvr.com/>

CES: WarnerMedia Chief Ann Sarnoff on Entertainment Shifts

MediaLink chair and chief executive Michael Kassan held a conversation during CES 2021 with WarnerMedia Studios and Networks Group chair and chief executive Ann Sarnoff on the impact of COVID-19 on the entertainment industry. Sarnoff, a 30+ year industry veteran, heads the Warner Bros. Pictures Group, HBO and HBO Max, the Warner Bros. Television Group, DC, and other WarnerMedia networks, channels and products. "When [AT&T Communications chief executive] John Stankey hired me a year and a half ago, he talked about breaking down the silos," she explained of the organization's new strategy. [More](#)

CES: Consumers Follow Brands That Align with Their Beliefs

At a CES 2021 panel, Insider Inc. chief marketing officer Jenifer Berman described a surge of "consumers that put their purchasing power behind brands that represent their beliefs," such as racial equity and sustainability. She noted that, with the advent of the COVID-19 pandemic, brands shifted their messaging so as not to appear tone deaf. Nissan U.S. vice president and chief marketing officer Allyson Witherspoon reported that her company, for the first time, wasn't trying to sell cars but instead to how to support consumers. [More](#)

CES 2021 ETC REPORT

Throughout CES, ETCentric editor Rob Scott and Dennis Kuba curated articles and source materials. On this and the following pages you have a compilation of the most relevant resources and reporting, including the stories published or posted on ETCentric.org. The links are divided and identified by type and category.

CNET

<https://www.cnet.com/ces/>

Engadget

<https://www.engadget.com/tag/ces2021>

The Verge

<https://www.theverge.com/ces>

CES Exhibitor B-Roll (CTA)

<https://www.cesbroll.com/exhibitor-b-roll/>

CES Curated Media Packages (CTA)

<https://www.cesbroll.com/curated-media-packages/>

CES Keynotes & Presentations (CTA)

<https://www.cesbroll.com/keynotes-presentations/>

CES Media Photos (CTA)

<https://ces.tech/Media/Multimedia/Media-Photos.aspx>

Tom's Hardware CES 2021 Awards: Hot New Hardware for the Year Ahead

<https://www.tomshardware.com/news/best-of-ces-2021>

Presenting the Best of CES 2021 Winners!

<https://www.engadget.com/best-of-ces-2021-winners-215307033.html>

The Verge Awards at CES 2021: Can't Touch This

<https://www.theverge.com/2021/1/16/22231489/ces-2021-verge-awards-best-laptop-tv-tech-pc-concept-gadget>

Best of CES 2021: Pandemic Tech, Green Tech, Air Taxis and Lots of Robots

<https://www.cnet.com/news/best-of-ces-2021-pandemic-tech-green-tech-air-taxis-and-lots-of-robots/>

The Hottest Products We Saw at CES 2021

<https://www.cnet.com/pictures/the-hottest-products-we-saw-at-ces-2021/>

Best of CES 2021: Welcome to the Great Indoors

<https://www.rollingstone.com/product-recommendations/electronics/best-of-ces-2021-product-launches-announcements-1114157/>

Intel at CES 2021

<https://www.intel.com/content/www/us/en/events/intel-ces.html>

Intel Newsroom

<https://newsroom.intel.com>

LG Virtual Exhibition

<https://www.lg.com/global/exhibition/index.html>

LG Newsroom

<https://ces2021.lgusnewsroom.com>

LG Newsroom: LG to Reinforce Industry Dominance with Ultimate TV Technology

<http://www.lgnewsroom.com/2021/01/lg-to-reinforce-industry-dominance-with-ultimate-tv-technology/>

LG Newsroom: Enhanced and Upgraded for 2021, LG's Newest Ultra Series Monitors Exceed All Expectations

<http://www.lgnewsroom.com/2021/01/enhanced-and-upgraded-for-2021-lgs-newest-ultra-series-monitors-exceed-all-expectations/>

LG Newsroom: LG'S 2021 Gram Laptops Stun with Large 16:10 Aspect Ratio Screens and Sleek New Design

<http://www.lgnewsroom.com/2021/01/lgs-2021-gram-laptops-stun-with-large-1610-aspect-ratio-screens-and-sleek-new-design/>

Microsoft: We Are CES Ready

<https://news.microsoft.com/ces2021/>

Panasonic Press Room

<https://na.panasonic.com/explore/newsroom>

See and Feel It All: Panasonic Introduces JZ2000, Its Flagship OLED TV for 2021

<https://na.panasonic.com/explore/press-release/see-and-feel-it-all-panasonic-introduces-jz2000-its-flagship-oled-tv-2021>

Better Normal for All: Samsung @ CES 2021

<https://www.samsung.com/us/explore/experiences/ces2021/>

Samsung Newsroom

<https://news.samsung.com/global/>

Everything You Need to Know About Samsung's Digital Cockpit 2021

<https://news.samsung.com/global/everything-you-need-to-know-about-samsungs-digital-cockpit-2021>

A Better Normal for All – Samsung Electronics Unveils CES 2021 Trailers

<https://news.samsung.com/global/video-a-better-normal-for-all-samsung-electronics-unveils-ces-2021-trailers>

Sony Square Digital Event Platform

<https://square.sony.com>

CES 2021 ETC REPORT

Sony Exhibits at CES 2021: Redefining Our Future with Tomorrow's Technologies
<https://ces.vporoom.com/2021-01-11-Sony-Exhibits-at-CES-2021>

CES 2021 Preview: 5 Biggest Trends to Watch
<https://www.tomsguide.com/features/ces-2021-preview-5-biggest-trends-to-watch>

5G Will Be a Huge Deal at CES 2021
<https://www.cnet.com/news/5g-will-be-a-huge-deal-at-ces-2021/>

Gary Shapiro: CES 2021 Will Have 1,000 Virtual Exhibits, 150,000 Visitors, and 100 Programming Hours
<https://venturebeat.com/2020/12/30/gary-shapiro-interview-ces-2021-will-have-over-1000-virtual-exhibits-perhaps-150000-online-visitors-and-100-hours-of-programming/>

The Best Tech of CES 2020: Where Are They Now?
<https://www.theverge.com/2021/1/13/22225459/best-tech-ces-2020-where-are-they-now-what-happened-next>

At CES and Beyond, CMOs See Potential with New Kinds of Virtual Events
<https://www.forbes.com/sites/martyswant/2021/01/22/at-ces-and-beyond-cmos-see-potential-with-new-kinds-of-virtual-events/>

Reflections On the First All-Virtual CES
<https://techcrunch.com/2021/01/19/reflections-on-the-first-all-virtual-ces/>

Background References

CES 2021 Makes History as Largest Digital Tech Industry Event
<https://ces.vporoom.com/2021-01-14-CES-2021-Makes-History-as-Largest-Digital-Tech-Industry-Event>

PC Sales Notch Strongest Growth in a Decade
<https://www.wsj.com/articles/pc-sales-notch-strongest-growth-in-a-decade-11610407047>

Spending on Streaming Services and Software Could Reach \$112 Billion in 2021
<https://www.hollywoodreporter.com/behind-screen/spending-on-streaming-services-and-software-could-reach-112-billion-in-2021>

Ampere: U.S. TV Households Now Average Four Streaming Services
<https://www.tvtechnology.com/news/ampere-us-tv-households-now-average-four-streaming-services>

TV Shipments to Dip in 2021 Despite 8K Surge – CTA
<https://www.lightreading.com/tv-shipments-to-dip-in-2021-despite-8k-surge---cta-/d/d-id/766556>

CTA: 2020 Record Year for TV Shipments
<https://www.tvtechnology.com/news/cta-2020-record-year-for-tv-shipments>

U.S. Consumers Going Bigger with Their TVs, NPD Finds
<https://www.tvtechnology.com/news/us-consumers-going-bigger-with-their-tvs-npd-finds>

2021 Is 'Breakout Year' for Gaming, Experts Agree at CES 2021 LG Trends & Tech Spotlight Session
<https://ces.vporoom.com/2021-01-14-2021-Is-Breakout-Year-For-Gaming-Experts-Agree-At-CES-2021-LG-Trends-Tech-Spotlight-Session>

The following are links to ETCentric posts covering CES.

CES: Snapshot of All-Digital Show's Announcements, Trends
<https://www.etcentric.org/ces-snapshot-of-all-digital-shows-announcements-trends/>

CTA Announces All-Digital Experience for January's CES 2021
<https://www.etcentric.org/cta-announces-all-digital-experience-for-januarys-ces-2021/>

All-Virtual CES 2021 Focuses on Innovation Despite Pandemic
<https://www.etcentric.org/all-virtual-ces-2021-focuses-on-innovation-despite-pandemic/>

CES: Panasonic, Illuminarium to Create Immersive Spectacles
<https://www.etcentric.org/ces-panasonic-illuminarium-to-create-immersive-spectacles/>

LG's Major Stake in Alphonso Boosts Its Streaming Ad Goals
<https://www.etcentric.org/lgs-major-stake-in-alphonso-boosts-its-streaming-ad-goals/>

Rendever Group VR for the Aged Offers Multiple Possibilities
<https://www.etcentric.org/rendever-group-vr-for-the-aged-offers-multiple-possibilities/>

5G TECHNOLOGY

CES: Acceleration of Technology, Adoption in 5G's First Year
<https://www.etcentric.org/ces-acceleration-of-technology-adoption-in-5gs-first-year/>

CES: AT&T and Qualcomm Executives Discuss 5G Use Cases
<https://www.etcentric.org/ces-att-and-qualcomm-executives-discuss-5g-use-cases/>

CES: Keynotes Address 5G, AI, Robotics, Pandemic, Security
<https://www.etcentric.org/ces-keynotes-address-5g-ai-robotics-pandemic-security/>

CES: Samsung, Ice Mobility on Trends in 5G Implementation

<https://www.etcentric.org/ces-samsung-ice-mobility-on-trends-in-5g-implementation/>

AUTOMOTIVE

CES: Samsung Intros New Version of Digital Cockpit for Cars

<https://www.etcentric.org/ces-samsung-intros-new-version-of-digital-cockpit-for-cars/>

DRONES

CES: Airpeak Drone Designed for Capturing Photos and Video

<https://www.etcentric.org/ces-airpeak-drone-designed-for-capturing-photos-and-video/>

GAMING

CES: LG Presents 48-Inch 'Bendable' OLED Gaming Monitor

<https://www.etcentric.org/ces-lg-presents-48-inch-bendable-oled-gaming-monitor/>

CES: Razer and Acer Offer QHD Screens for Gaming Laptops

<https://www.etcentric.org/ces-razer-and-acer-offer-qhd-screens-for-gaming-laptops/>

KEYNOTES & PRESENTATIONS

CES 2021 Opens with Predictions on Tech Trends for the Year

<https://www.etcentric.org/ces-2021-with-predictions-on-tech-trends-for-the-year/>

CTA Researchers Discuss Key Tech Trends to Expect at CES

<https://www.etcentric.org/cta-researchers-discuss-key-tech-trends-to-expect-at-ces/>

CES 2021 Vision: Technology Is a Tool and a Force for Good

<https://www.etcentric.org/ces-2021-vision-technology-is-a-tool-and-a-force-for-good/>

CES: Acceleration of Technology, Adoption in 5G's First Year

<https://www.etcentric.org/ces-acceleration-of-technology-adoption-in-5gs-first-year/>

CES: Advertisers Need Better Measurement to Embrace OTT

<https://www.etcentric.org/ces-advertisers-need-better-measurement-to-embrace-ott/>

CES: AT&T and Qualcomm Executives Discuss 5G Use Cases

<https://www.etcentric.org/ces-att-and-qualcomm-executives-discuss-5g-use-cases/>

CES: Brands Rethink Entertainment and Trends in Marketing

<https://www.etcentric.org/ces-brands-rethink-entertainment-and-trends-in-marketing/>

CES: Consumers Follow Brands That Align with Their Beliefs

<https://www.etcentric.org/ces-consumers-follow-brands-that-align-with-their-beliefs/>

CES: Economic Council Chief Discusses Biden's Tech Goals

<https://www.etcentric.org/ces-economic-council-chief-discusses-bidens-tech-goals/>

CES: Execs Consider Post-Pandemic Future of Remote Work

<https://www.etcentric.org/ces-execs-consider-post-pandemic-future-of-remote-work/>

CES: Identifying Consumer Trends Shaping the New Normal

<https://www.etcentric.org/ces-identifying-consumer-trends-shaping-the-new-normal/>

CES: Industry Experts Discuss the Cryptocurrency Landscape

<https://www.etcentric.org/ces-industry-experts-discuss-the-cryptocurrency-landscape/>

CES: Keynotes Address 5G, AI, Robotics, Pandemic, Security

<https://www.etcentric.org/ces-keynotes-address-5g-ai-robotics-pandemic-security/>

CES: Microsoft Keynote on Promises, Responsibility of Tech

<https://www.etcentric.org/ces-microsoft-keynote-on-promises-responsibility-of-tech/>

CES: Panel Examines Issues of Gender and Racial Bias in AI

<https://www.etcentric.org/ces-panel-examines-issues-of-gender-and-racial-bias-in-ai/>

CES: Pulitzer Winner Details Megashifts Impacting Our World

<https://www.etcentric.org/ces-pulitzer-winner-details-megashifts-impacting-our-world/>

CES: Samsung, Ice Mobility on Trends in 5G Implementation

<https://www.etcentric.org/ces-samsung-ice-mobility-on-trends-in-5g-implementation/>

CES: Sessions Examine the Potential of Quantum Computing

<https://www.etcentric.org/ces-sessions-examine-the-potential-of-quantum-computing/>

CES: WarnerMedia Chief Ann Sarnoff on Entertainment Shifts

<https://www.etcentric.org/ces-warnermedia-chief-ann-sarnoff-on-entertainment-shifts/>

LIDAR

CES: Seoul Robotics, Mobileye Enable Lidar for Smart Cities
<https://www.etcentric.org/ces-seoul-robotics-mobileye-enable-lidar-for-smart-cities/>

COVID PANDEMIC & STAYING AT HOME

CES: Masks, Sensors, Robotics and Fitness in the COVID Era
<https://www.etcentric.org/ces-masks-sensors-robotics-and-fitness-in-the-covid-era/>

QUANTUM COMPUTING

CES: Sessions Examine the Potential of Quantum Computing
<https://www.etcentric.org/ces-sessions-examine-the-potential-of-quantum-computing/>

SMARTPHONES

CES: Rollable Tech Helps Mobile Devices Change Dimensions
<https://www.etcentric.org/ces-rollable-tech-helps-mobile-devices-change-dimensions/>

TELEVISIONS & DISPLAYS

CES: The Frame TV From Samsung Can Rotate Its Orientation
<https://www.etcentric.org/ces-the-frame-tv-from-samsung-can-rotate-its-orientation/>

CES: LG Presents 48-Inch 'Bendable' OLED Gaming Monitor
<https://www.etcentric.org/ces-lg-presents-48-inch-bendable-oled-gaming-monitor/>

CES: LG Unveils Evo OLED Display with Improved Brightness
<https://www.etcentric.org/ces-lg-unveils-evo-oled-display-with-improved-brightness/>

CES: LG Unveils Transparent OLED Screen for Smart Homes
<https://www.etcentric.org/ces-lg-unveils-transparent-oled-screen-for-smart-homes/>

CES: New Sony and LG TVs Support the ATSC 3.0 Standard
<https://www.etcentric.org/ces-new-sony-and-lg-tvs-support-the-atsc-3-0-standard/>

CES: Panasonic Debuts New OLED TV with Surround Sound
<https://www.etcentric.org/ces-panasonic-debuts-new-oled-tv-with-surround-sound/>

CES: Samsung's New MicroLED TVs Offer Improved Contrast
<https://www.etcentric.org/ces-samsungs-new-microled-tvs-offer-improved-contrast/>

CES: Sony Promotes Glasses-Free 3D Spatial Reality Display
<https://www.etcentric.org/ces-sony-promotes-glasses-free-3d-spatial-reality-display/>

CES: Sony, TCL Televisions Will Feature Streamer Google TV
<https://www.etcentric.org/ces-sony-tcl-televisions-will-feature-streamer-google-tv/>

CES: TV Technologies Takes Center Stage at Annual Confab
<https://www.etcentric.org/ces-tv-technologies-takes-center-stage-at-annual-confab/>

Dell Debuts Features for PCs and Laptops Ahead of CES 2021
<https://www.etcentric.org/dell-debuts-features-for-pcs-and-laptops-ahead-of-ces-2021/>

Dell Unveils 40-Inch Curved 5K Monitor, Other Hi-Res Displays
<https://www.etcentric.org/dell-unveils-40-inch-curved-5k-monitor-other-hi-res-displays/>

LG Electronics Unveils Mini LED QNED TV Ahead of CES 2021
<https://www.etcentric.org/lg-electronics-unveils-mini-led-qned-tv-ahead-of-ces-2021/>

Sony Showcases Modular, Hi-Resolution Virtual Set Displays
<https://www.etcentric.org/sony-showcases-modular-hi-resolution-virtual-set-displays/>

Sony's Cognitive Processor Tech Comes to Next-Gen TV Sets
<https://www.etcentric.org/sonys-cognitive-processor-tech-comes-to-next-gen-tv-sets/>

WI-FI 6E

Wi-Fi 6E Certification Program Paves the Way for New Devices
<https://www.etcentric.org/wi-fi-6e-certification-program-paves-the-way-for-new-devices/>

The following are links to outside resources we used for our CES reporting.

MISCELLANEOUS

6 Key Themes Driving Headlines at CES 2021
<https://www.forbes.com/sites/danielnewman/2021/01/14/6-key-themes-driving-headlines-at-ces-2021/>

14 Tech Products From CES 2021 I Can't Wait to Buy
<https://www.forbes.com/sites/forbes-personal-shopper/2021/01/19/best-of-ces-2021/>

CES 2021 ETC REPORT

Asia's Casino Capital Macau to Host a CES Alternative in 2021

<https://techcrunch.com/2020/12/22/macao-ces-alternative/>

At CES and Beyond, CMOs See Potential with New Kinds of Virtual Events

<https://www.forbes.com/sites/martyswant/2021/01/22/at-ces-and-beyond-cmos-see-potential-with-new-kinds-of-virtual-events/>

The Best Tech of CES 2020: Where Are They Now?

<https://www.theverge.com/2021/1/13/22225459/best-tech-ces-2020-where-are-they-now-what-happened-next>

Best of CES 2021: Pandemic Tech, Green Tech, Air Taxis and Lots of Robots

<https://www.cnet.com/news/best-of-ces-2021-pandemic-tech-green-tech-air-taxis-and-lots-of-robots/>

Best of CES 2021: Welcome to the Great Indoors

<https://www.rollingstone.com/product-recommendations/electronics/best-of-ces-2021-product-launches-announcements-1114157/>

CES 2021: Cameras, Drones & Everything to Expect From the Tech Supershow

<https://www.digitalcameraworld.com/news/ces-2021>

CES 2021 Highlights: 79 Gadgets and Glimpses Into the Future

<https://www.wired.com/story/ces-2021-highlights-liveblog-whole-show/>

CES 2021: The World's Largest Tech Show Trades Las Vegas for Cyberspace

<https://www.wsj.com/articles/ces-2021-the-worlds-largest-tech-show-trades-las-vegas-for-cyberspace-11610290800>

CES 2021 Preview: 5 Biggest Trends to Watch

<https://www.tomsguide.com/features/ces-2021-preview-5-biggest-trends-to-watch>

CES 2021 Trends: Top 6 Things We Expect to See at the All-Virtual Show

<https://www.cnet.com/news/ces-2021-trends-top-6-things-we-expect-to-see-at-all-virtual-show-5g-pandemic-tech-transparent-oled/>

CES 2021: Using AI to Tackle Big Picture World Problems

<https://innotechtoday.com/ces-2021-using-ai-to-tackle-big-picture-world-problems/>

CES 2021's Coolest New Gadgets: Rollable Phones, Giant TVs, Coronavirus Killers

<https://www.cnet.com/pictures/ces-2021-coolest-new-gadgets-rollable-phones-giant-tvs-coronavirus-killers/>

CES 2021: What to Look Out for at the All-Digital Tech Show

<https://www.pcgamer.com/ces-2021-dates-whats-on-how-to-watch/>

CIO Scramble to Equip Remote Workers Sparked Best PC Growth Rate in Decade

<https://www.wsj.com/articles/pcs-experience-best-growth-rate-in-decade-11610407056>

Corporate Social Responsibility Took Stage at CES, But 2021 Demands More

<https://www.forbes.com/sites/carolinamilanesi/2021/01/23/corporate-social-responsibility-took-stage-at-ces-but-2021-demands-more/>

Engadget's Live Virtual CES Stage Kicks Off Monday at 7:30am ET

<https://www.engadget.com/engadget-ces-2021-virtual-stage-235031332.html>

Experience CES 2021 for Yourself with CNET's Livestream

<https://www.cnet.com/news/experience-ces-2021-for-yourself-with-cnet-livestream-heres-how-to-watch/>

The Farm Goes VR: John Deere's Pitch for CES 2021 Puts You in the Tractor's Seat

<https://www.cnet.com/news/john-deere-plans-to-send-vr-headsets-with-virtual-tractor-demos-for-ces-2021/>

Fostering Advancement Around the Globe – Introducing C-Lab at CES 2021

<https://news.samsung.com/global/fostering-advancement-around-the-globe-introducing-c-lab-at-ces-2021>

Gary Shapiro: CES 2021 Will Have 1,000 Virtual Exhibits, 150,000 Visitors, and 100 Programming Hours

<https://venturebeat.com/2020/12/30/gary-shapiro-interview-ces-2021-will-have-over-1000-virtual-exhibits-perhaps-150000-online-visitors-and-100-hours-of-programming/>

The Hottest Products We Saw at CES 2021

<https://www.cnet.com/pictures/the-hottest-products-we-saw-at-ces-2021/>

LG Introduces Designer Appliances at CES 2021

<https://www.prnewswire.com/news-releases/lg-introduces-designer-appliances-at-ces-2021-301199991.html>

Origin's Hex Home Security System Analyses Motion with Simple Sensors

<https://www.cnet.com/news/origins-hex-home-security-system-analyses-motion-with-simple-sensors/>

Panasonic Will Help Create Immersive Entertainment Spectacles in Illuminariums

<https://venturebeat.com/2021/01/11/panasonic-will-help-create-immersive-entertainment-spectacles-in-illuminariums/>

Presenting the Best of CES 2021 Winners!

<https://www.engadget.com/best-of-ces-2021-winners-215307033.html>

Reflections On the First All-Virtual CES

<https://techcrunch.com/2021/01/19/reflections-on-the-first-all-virtual-ces/>

Samsung's Upcycling Program Is Designed to Give New Life to Old Tech

<https://techcrunch.com/2021/01/11/samsungs-upcycling-program-is-designed-to-give-new-life-to-old-tech/>

Sony Unveils 'Immersive Reality' Concert Experience with Madison Beer at CES
<https://variety.com/2021/digital/news/sony-immersive-reality-concert-madison-beer-ces-1234882988/>

Tech That Will Make the World Better From CES 2021
<https://www.cnet.com/pictures/tech-that-will-make-the-world-better-from-ces-2021/>

The Top 6 Trends to Expect at CES 2021
<https://www.cnet.com/news/top-trends-to-expect-ces-2021/>

The Verge Awards at CES 2021: Can't Touch This
<https://www.theverge.com/2021/1/16/22231489/ces-2021-verge-awards-best-laptop-tv-tech-pc-concept-gadget>

The Weirdest New Gadgets at CES 2021
<https://www.cnet.com/pictures/the-weirdest-new-gadgets-at-ces-2021/>

5G TECHNOLOGY

5 Predictions on the Future of 5G From CES 2021
<https://www.crn.com/news/networking/5-predictions-on-the-future-of-5g-from-ces-2021>

5G Makes Waves at CES 2021
<https://www.forbes.com/sites/bobodonnell/2021/01/12/5g-makes-waves-at-ces-2021/>

5G Will Be a Huge Deal at CES 2021
<https://www.cnet.com/news/5g-will-be-a-huge-deal-at-ces-2021/>

The Hottest Enterprise 5G Trends We Saw at CES 2021
<https://www.crn.com/slide-shows/networking/the-hottest-enterprise-5g-trends-we-saw-at-ces-2021>

Verizon CEO Makes the Case That 5G Is More Than Just Faster Phones
<https://www.cnet.com/news/verizon-ceo-makes-the-case-that-5g-is-more-than-just-faster-phones/>

Verizon to Trumpet 5G in All-Digital CES 2021 Keynote
<https://www.cnet.com/news/verizon-to-trumpet-5g-in-all-digital-ces-2021-keynote/>

AUDIO & MUSIC

Harman's Latest Audio Tech Is Designed for In-Car Concerts
<https://www.engadget.com/harman-live-in-car-audio-platform-151249649.html>

Sonos on Where Streaming Music Is Going Next
<https://www.engadget.com/sonos-radio-interview-ces-2021-005559353.html>

These Are Sony's First 360-Degree Audio Speakers
<https://www.theverge.com/2021/1/8/22221189/sony-360-degree-audio-speakers-srs-ra5000-ra3000-reality-audio>

Two Years in, Sony Wants to Bring 360 Reality Audio to the Masses
<https://www.engadget.com/sony-360-reality-audio-ces-2021-130027671.html>

Virtual CES: Sony Highlights New Headphone Tech for Remote Sound Mixing
<https://www.hollywoodreporter.com/behind-screen/virtual-ces-sony-highlights-new-headphone-tech-for-remote-sound-mixing>

AUTOMOTIVE

The Best Cars and Driving Tech From CES 2021
<https://www.cnet.com/news/the-best-cars-and-driving-tech-from-ces-2021/>

Cadillac Offers a Glimpse at the Lyric EV's 33-Inch Display
<https://www.engadget.com/cadillac-offers-a-glimpse-at-the-lyric-evs-33-inch-display-175006045.html>

Drone Giant DJI Builds Team to Work on Autonomous Car Tech
<https://venturebeat.com/2021/01/14/drone-giant-dji-builds-team-to-work-on-autonomous-car-tech/>

GM Debuts BrightDrop EP1, a Motorized Delivery Box at CES 2021
<https://www.cnet.com/roadshow/news/gm-brightdrop-ep1-electric-pallet-delivery-fedex-ces/>

GM Will Reveal Its New Chevy Bolt and Bolt 'EUV' Next Month
<https://www.engadget.com/chrysler-teaser-chevy-electric-bolt-super-cruise-february-reveal-143000632.html>

Harman's Latest Audio Tech Is Designed for In-Car Concerts
<https://www.engadget.com/harman-live-in-car-audio-platform-151249649.html>

Lidar Tech on the Rise at CES to Power Future Smart Cities, Autonomous Cars
<https://www.washingtonpost.com/technology/2021/01/16/lidar-smart-cities-autonomous-cars/>

Mercedes-Benz Made a 56-Inch 'Hyperscreen' for Its EQS Electric Car
<https://www.engadget.com/mercedes-mbox-hyperscreen-eqs-161520472.html>

Mercedes Teases an AI-Powered Version of Its MBUX Infotainment System
<https://www.engadget.com/mercedes-mbox-hyperscreen-ces-2021-tease-204213039.html>

Mercedes Will Debut the Ultrawide MBUX Hyperscreen at CES 2021
<https://www.cnet.com/roadshow/news/mercedes-will-debut-the-ultrawide-mbox-hyperscreen-at-ces-2021/>

Panasonic Unveils Its Vision for Future Automotive Interiors at CES 2021
<https://www.engadget.com/panasonic-future-automotive-interiors-at-ces-2021-034524414.html>

Samsung Digital Cockpit 2021: The Future Is Near

<https://www.slashgear.com/samsung-digital-cockpit-2021-the-future-is-near-11654369/>

Samsung Has Unveiled a 'Digital Cockpit' Concept That Puts a 49-Inch Screen in Front of the Windshield

<https://www.businessinsider.com/samsung-unveiled-2021-digital-cockpit-5g-and-screens-2021-1>

Sony Reveals More Details on Its Secretive Vision-S Sedan

<https://techcrunch.com/2021/01/11/sony-reveals-more-details-on-its-secretive-vision-s-sedan/>

CAMERA TECHNOLOGY

Canon Made a Site That Lets You 'Take Photos' From a Real Satellite

<https://www.engadget.com/photos-of-earth-from-space-canon-satellite-5d-mark-iii-110335471.html>

Every Smart Home Security Camera Announced at CES 2021

<https://www.cnet.com/pictures/every-smart-home-security-camera-announced-at-ces-2021/>

GoPro Remote Launches Alongside Camera Updates for Faster Data Transfer

<https://www.theverge.com/2020/12/17/22180159/gopro-remote-firmware-1-5-faster-content-transfer>

GoPro's Redesigned Remote Lets You Control Your Action Cams from Afar

<https://gizmodo.com/gopros-redesigned-remote-lets-you-control-your-action-c-1845903227>

New GoPro Labs Firmware Launches, Unlocking Advanced Features for GoPro Cameras

<https://ces.vporoom.com/2021-01-13-New-GoPro-Labs-Firmware-Launches-Unlocking-Advanced-Features-for-GoPro-Cameras>

COVID PANDEMIC & STAYING AT HOME

CES 2021 Showcases Masks, Sensors and Other Tech to Help Fight COVID-19

<https://www.cnet.com/health/ces-2021-showcases-masks-sensors-and-other-tech-to-help-fight-covid-19/>

CES 2021 Showed Us How Robots Can Ease Our Pandemic Woes

<https://www.cnet.com/news/ces-2021-showed-us-how-robots-can-ease-our-pandemic-woes/>

CES 2021: These Giant Robots Can Disinfect Classrooms and Offices with UVC Light

<https://www.cnet.com/news/ces-2021-these-giant-robots-can-disinfect-classrooms-and-offices-with-uvc-light/>

The Future of Work From CES: The Headquarters at Home

<https://www.computerworld.com/article/3603429/the-future-of-work-from-ces-the-headquarters-at-home.html>

The Home Fitness Tech That Will Help Us Stay Active in 2021

<https://www.engadget.com/home-fitness-tech-nautilus-bowflex-tonal-panel-ces-2021-014128523.html>

The Pandemic Was Top of Mind in the Tech of CES 2021

<https://techcrunch.com/2021/01/15/the-pandemic-was-top-of-mind-in-the-tech-of-ces-2021/>

Personal Training Stays Home at CES 2021

<https://www.cnet.com/health/personal-training-stays-at-home-at-ces-2021/>

Razer's High-Tech Face Mask Filters Air and Amplifies Your Voice, Bane-Style

<https://www.digitaltrends.com/computing/razer-project-hazel-smart-mask-ces-2021/>

Samsung's New TVs Can Track Your Workout Reps and Form

<https://www.engadget.com/samsung-health-qled-tv-smart-trainer-hands-on-160027517.html>

Tech Industry Uncovers New Ways to Mask Up Against COVID-19 at CES 2021

<https://www.cnet.com/health/tech-industry-shows-new-ways-to-mask-up-during-covid-19-ces-2021/>

This Year's Crop of Robots at CES 2021 Is All About Fighting COVID-19

<https://www.techrepublic.com/article/this-years-crop-of-robots-at-ces-2021-is-all-about-fighting-covid-19/>

CES Goes Full Pandemic with Smart Masks, Stickers to Detect COVID and the Biggest Wi-Fi Update in Years

<https://www.washingtonpost.com/technology/2021/01/11/ces/>

Dishwashing Robots and Bluetooth Masks: Pandemic Products Hit Tech's Biggest Show

<https://www.cnn.com/2021/01/12/tech/ces-2021-pandemic-tech/index.html>

DRONES

The Cadillac Personal Drone Is the Cadillac of Personal Drones

<https://techcrunch.com/2021/01/12/the-cadillac-personal-drone-is-the-cadillac-of-personal-drones/>

Cadillac Shows Off a Single-Seater VTOL Drone Concept

<https://www.engadget.com/gm-cadillac-ev-drone-vtol-concept-lyriq-celestiq-144643388.html>

Drone Giant DJI Builds Team to Work on Autonomous Car Tech

<https://venturebeat.com/2021/01/14/drone-giant-dji-builds-team-to-work-on-autonomous-car-tech/>

A Look Back on the Drones We Saw at CES 2021

<https://dronedj.com/2021/01/19/a-look-back-on-the-drones-we-saw-at-ces-2021/>

<https://dronedj.com/2021/01/11/skydio-x2-recognized-with-ces-2021-best-of-innovation-award/>

<https://techcrunch.com/2021/01/11/sony-unveils-airpeak-its-camera-carrying-video-drone/>

<https://www.theverge.com/2021/1/11/22225758/sony-airpeak-drone-alpha-photography-cameras-ces-2021-announcement>

<https://www.verizon.com/about/news/verizon-ups-skyward-drone-delivery-ces-2021>

GAMING

<https://ces.vporoom.com/2021-01-14-2021-1s-Breakout-Year-For-Gaming-Experts-Agree-At-CES-2021-LG-Trends-Tech-Spotlight-Session>

<https://www.theverge.com/2021/1/12/22218681/acer-nitro-5-gaming-laptop-intel-11th-tiger-lake-h35-amd-ryzen-rtx-3080-qhd-release-date-price>

<https://www.engadget.com/acer-nitro-xb282k-kv-annonce-180011254.html>

<https://www.engadget.com/amd-ryzen-7-5800-ryzen-9-5900-cpu-170006935.html>

<https://www.engadget.com/asus-rog-swift-pg32uq-4k-120hz-gaming-monitor-184020493.html>

<https://www.digitaltrends.com/computing/best-gaming-laptops-ces-2021/>

<https://www.cnet.com/news/at-ces-2021-gaming-laptops-arent-what-they-used-to-be-and-thats-a-good-thing/>

<https://www.engadget.com/asus-rog-future-gaming-laptops-225017333.html>

<https://www.cnet.com/news/infinity-game-table-hands-on-touch-screen-table-gives-classic-board-games-new-spin/>

<https://www.engadget.com/lenovo-nec-lavie-mini-modern-netbook-game-console-hybrid-concept-140010079.html>

<https://hypebeast.com/2021/1/lenovo-nec-lavie-mini-handheld-pc-gaming-device-prototype-release>

<https://www.engadget.com/lenovo-legion-gaming-laptop-2021-170024599.html>

<https://www.theverge.com/2021/1/14/22217171/gaming-laptops-qhd-screens-display-fast-refresh-rate>

<https://www.engadget.com/razer-blade-15-17-rtx-30-gpu-quad-hd-174536217.html>

<https://www.cnet.com/news/razer-conceptualizes-next-gen-gaming-chair-at-ces-2021-with-project-brooklyn/>

GOOGLE ASSISTANT

<https://www.androidpolice.com/2021/01/18/heres-everything-with-google-assistant-revealed-at-ces-2021/>

GOOGLE TV

<https://www.cnet.com/news/google-tv-is-the-new-android-tv-coming-to-sony-smart-tvs-this-year-ces-2021-tcl/>

<https://9to5google.com/2021/01/11/tcl-google-tv-2021/>

INTERNET OF THINGS

<https://www.crn.com/slide-shows/internet-of-things/8-cool-iiot-sensors-and-devices-that-stole-the-show-at-ces-2021>

<https://iotbusinessnews.com/2021/01/25/20211-iot-at-ces-2021-a-sign-of-the-times/>

KEYNOTES & PRESENTATIONS

Watch Samsung's CES Event in Under 9 Minutes

<https://www.engadget.com/watch-samsung-ces-2021-supercut-180613695.html>

Watch LG's CES Event in 9 Minutes

<https://www.engadget.com/lg-ces-2021-supercut-183721229.html>

Watch TCL's CES Keynote in 9 Minutes

<https://www.engadget.com/ces-2021-tcl-keynote-supercut-211948395.html>

Watch the ASUS CES 2021 Keynote in 8 Minutes

<https://www.engadget.com/asus-ces-2021-keynote-supercut-214926063.html>

Watch the ASUS ROG CES 2021 Keynote in 12 Minutes

<https://www.engadget.com/asus-rog-ce-2021-keynote-022817422.html>

Watch NVIDIA's CES 2021 Keynote in 10 Minutes

<https://www.engadget.com/nvidia-ces-2021-keynote-video-supercut-214335632.html>

Watch AMD's CES Keynote in 4 Minutes

<https://www.engadget.com/amd-ces-2021-keynote-supercut-223845721.html>

Watch Intel's CES 2021 Press Conference in 10 Minutes

<https://www.engadget.com/intel-ces-2021-keynote-supercut-022500298.html>

Watch GM's CES 2021 Keynote in 10 Minutes

<https://www.engadget.com/gm-ces-2021-keynote-supercut-174714179.html>

Watch Mercedes-Benz's CES Keynote in Under 7 Minutes

<https://www.engadget.com/watch-mercedes-benz-ces-2021-supercut-190548830.html>

CES 2021: Microsoft President Brad Smith Urges Action to Beef Up Cybersecurity

<https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/ces-2021-microsoft-president-brad-smith-urges-action-to-beef-up-cybersecurity-62104494>

AMD CEO Lisa Su Talks Core Counts, Console Launches, and Apple Relationship

<https://venturebeat.com/2021/01/15/amd-ceo-lisa-su-talks-core-counts-console-launches-and-apple-relationship/>

CES Panels Highlight Streaming's Growing Pains

<https://www.nexttv.com/features/ces-panels-highlight-streamings-growing-pains>

A 'Virtual Human' Presented Some of LG's CES Event

<https://www.engadget.com/lg-reah-keem-virtual-human-press-conference-ces-2021-135111592.html>

Google and Microsoft Chat Accessibility in Tech

<https://www.engadget.com/google-microsoft-accessibility-tech-xr-disabilities-inclusive-design-205252961.html>

'The Run Rate of the Company Going Forward Will Be Faster Forever,' Says Walmart CEO McMillan

<https://www.zdnet.com/article/ces-2021-the-run-rate-of-the-company-going-forward-will-be-faster-forever-says-walmart-ceo-mcmillan/>

LIDAR

Lidar Tech on the Rise at CES to Power Future Smart Cities, Autonomous Cars

<https://www.washingtonpost.com/technology/2021/01/16/lidar-smart-cities-autonomous-cars/>

Mobileye Announces New Lidar and Radar Tech for CES 2021

<https://www.cnet.com/roadshow/news/mobileye-ces-2021-radar-lidar-mapping/>

Mobileye Puts Lidar on a Chip – and Helps Map Intel's Future

<https://www.wired.com/story/mobileye-lidar-on-a-chip-intel/>

PCS, LAPTOPS & TABLETS

Acer Reveals Its First Chromebook with AMD's Latest Ryzen CPUs

<https://www.engadget.com/acer-chromebook-spin-514-amd-ryzen-3000c-processor-180052547.html>

AMD Reveals Ryzen 5000 Series Mobile Processors at CES 2021

<https://www.cnet.com/news/amd-reveals-ryzen-5000-series-mobile-processors-at-ces-2021/>

AMD's Ryzen 5000 Laptop CPUs Arrive with Big Performance Claims

<https://www.engadget.com/amd-ryzen-5000-mobile-cpus-for-laptops-performance-claims-170001568.html>

Asus Hypes New Laptops for CES 2021

<https://www.tomshardware.com/news/ces2021-asus-rog-tuf-rx30-notebooks>

Best CES 2021 Laptops: Top Notebooks, 2-in-1s, and Ultraportables

<https://www.zdnet.com/article/best-laptops-at-ces-2021-top-notebooks-2-in-1s-and-ultraportables/>

CES 2021: Acer to Launch Ryzen-Powered Aspire Laptops

<https://www.zdnet.com/article/ces-2021-acer-to-launch-ryzen-powered-aspire-laptops/>

CES 2021: Dell Launches Monitors, Latitude, OptiPlex, Precision Devices Aimed at Work's New Normal

<https://www.zdnet.com/article/ces-2021-dell-launches-monitors-latitude-optiplex-precision-devices-aimed-at-works-new-normal/>

CES 2021: Dell Unveils PCs, Laptops, Software and Monitors for the New Normal of Work

<https://www.techrepublic.com/article/ces-2021-dell-unveils-new-pcs-laptops-software-and-monitors-for-the-new-normal-of-work/>

At CES 2021, Laptops Go Beyond the 2-in-1

<https://www.zdnet.com/article/ces-2021-laptops-go-beyond-the-2-in-1/>

CES 2021 Preview: Laptops, Chromebooks and Gaming PCs

<https://www.cnet.com/news/ces-2021-preview-laptops-chromebooks-and-gaming-pcs/>

CES Has Blessed Us with a Three-Webcam Laptop

<https://www.engadget.com/avita-admiror-ii-ring-light-nexstgo-ces-2021-154524749.html>

HP and Lenovo Discuss the Wild Side of Laptops in 2021

<https://www.engadget.com/hp-lenovo-laptops-2021-and-beyond-panel-stage-ces-2021-002635150.html>

Intel's Rocket Lake S CPUs Are up to 19 Percent Faster Than Last Year

<https://www.engadget.com/intel-rocket-lake-s-desktop-cpu-cores-213046856.html>

Lenovo's Tab P11 Android Tablet Is Targeted at Families

<https://www.engadget.com/lenovo-tab-p11-ces-2021-140034973.html>

LG Refreshes Its Light Gram Laptop Lineup with Intel Evo Certification

<https://www.engadget.com/lg-gram-intel-evo-ces-2021-010022693.html>

Samsung Expands Chromebook and Tablet Offerings at CES 2021

<https://www.forbes.com/sites/patrickmoorhead/2021/01/19/samsung-expands-chromebook-and-tablet-offerings-at-ces-2020/>

Samsung Galaxy Chromebook 2 Is a Premium Chrome OS 2-in-1 at a Better Price

<https://www.cnet.com/news/samsung-galaxy-chromebook-2-is-a-premium-chrome-2-in-1-at-a-better-price/>

Samsung's Galaxy Chromebook 2 Is Cheaper and Sports a QLED Screen

<https://www.engadget.com/samsung-galaxy-chromebook-2-hands-on-140039848.html>

TCL Teases a 17-Inch Tablet That Unfurls Like a Scroll

<https://www.engadget.com/tcl-17-inch-scroll-tablet-172125383.html>

PERSONAL TECH

AR Contact Lens Wins CES' Last Gadget Standing Competition

<https://www.reviewjournal.com/business/conventions/ces/ar-contact-lens-wins-ces-last-gadget-standing-competition-2251189/>

The Devices, Software and Health Tech Headlines of CES 2021

<https://www.mobihealthnews.com/news/devices-software-and-health-tech-headlines-ces-2021>

PROJECTORS

Hisense's 2021 Laser Projection TVs Promise Better Colors Than OLED or Quantum Dot

<https://www.cnet.com/news/hisenses-2021-laser-tvs-promise-better-colors-than-oled-or-quantum-dot/>

Asus' Latte Dispenses Movies Instead of Coffee and Milk

<https://www.theverge.com/circuitbreaker/2021/1/13/22229575/asus-latte-movie-projector-mobile>

LG Launches Laser-Powered 4K HDR Projector at CES 2021

<https://www.cnet.com/news/lg-launches-laser-powered-4k-hdr-projector-at-ces-2021/>

New LG CineBeam Projector Elevates Home Movie Viewing to New Heights

<https://ces2021.lgusnewsroom.com/press-release/new-lg-cinebeam-projector-elevates-home-movie-viewing-to-new-heights/>

QUANTUM COMPUTING

Quantum Computing Research Helps IBM Win Top Spot in Patent Race

<https://www.cnet.com/news/quantum-computing-research-helps-ibm-win-top-spot-in-patent-race/>

IBM Leads in Quantum Computing, Ford in Driverless Car Patents

<https://www.bloomberg.com/news/articles/2021-01-12/ibm-leads-in-quantum-computing-ford-in-driverless-car-patents>

ROBOTICS

CES 2021 Showed Us How Robots Can Ease Our Pandemic Woes

<https://www.cnet.com/news/ces-2021-showed-us-how-robots-can-ease-our-pandemic-woes/>

CES 2021: These Giant Robots Can Disinfect Classrooms and Offices with UVC Light

<https://www.cnet.com/news/ces-2021-these-giant-robots-can-disinfect-classrooms-and-offices-with-uv-light/>

Here Are the Robots Taking the Virtual Stage at CES 2021

<https://www.cnet.com/news/here-are-the-robots-taking-the-virtual-stage-at-ces-2021/>

Reachy the Robot Can Now Be Controlled via VR

<https://www.engadget.com/reachy-the-robot-can-now-be-controlled-via-vr-200508703.html>

Samsung's CES 2021 Robots Will Clean Your House and Pour You a Glass of Wine

<https://www.cnet.com/news/samsung-ces-2021-robots-will-clean-your-house-and-pour-you-a-glass-of-wine/>

This Year's Crop of Robots at CES 2021 Is All About Fighting COVID-19

<https://www.techrepublic.com/article/this-years-crop-of-robots-at-ces-2021-is-all-about-fighting-covid-19/>

Weird, Cute and Vaguely Menacing: Here Come the Robots of CES 2021

<https://www.cnet.com/pictures/weird-cute-and-vaguely-menacing-here-come-the-robots-of-ces-2021/>

SMARTPHONES

LG Confirms It May Abandon Smartphones

<https://www.slashgear.com/lg-confirms-it-may-abandon-smartphones-20655895/>

LG Rollable and Other New Rolling, Folding Phones Give Me Something to Look Forward To

<https://www.cnet.com/news/lg-rollable-and-other-new-rolling-foldable-phones-give-me-something-to-look-forward-to/>

LG Rollable Phone Is Official – and You Can Buy One This Year

<https://www.tomsguide.com/news/lg-rollable-phone-just-stole-the-show-at-ces-2021-heres-your-first-look>

Phones of CES 2021: Rollable Phones, the Galaxy S21 Lineup and More

<https://www.cnet.com/pictures/10-phones-unveiled-at-ces-2021-lg-rollable-galaxy-s21-lineup-budget-phones-5g/>

Qualcomm's New In-Screen Fingerprint Reader Is Bigger and Faster

<https://arstechnica.com/gadgets/2021/01/qualcomms-new-in-screen-fingerprint-reader-is-bigger-and-faster/>

Rollables Are the New Foldables

<https://techcrunch.com/2021/01/12/rollables-are-the-new-foldables/>

Samsung Seizes Smartphone Initiative as Sanctions Hobble Huawei

<https://www.wsj.com/articles/samsung-seizes-smartphone-initiative-as-sanctions-hobble-huawei-11610449992>

What to Expect in Mobile at CES 2021: Galaxy S21, Foldables, Wearables, and 5G

<https://www.digitaltrends.com/mobile/ces-2021-what-expect-mobile/>

TELEVISIONS & DISPLAYS

All the New TV Smarts From CES 2021: Virtual Event Still Had Some Surprises

<https://www.tvtechnology.com/news/all-the-new-tv-smarts-from-ces-2021>

ATSC 3.0 Backers Tout a Brighter Picture for NextGen TV at CES 2021

<https://www.fiercevideo.com/broadcasting/atsc-3-0-backers-tout-a-brighter-picture-for-nextgen-tv-at-ces-2021>

NextGen TV to Deliver 4K TV for More Broadcasters, TVs, and STBs

<https://www.twice.com/product/video/tv/nextgen-tv-to-deliver-4k-tv-for-more-broadcasters-tvs-and-stbs>

LG Announces 2021 NextGen TVs

<https://ces.vporoom.com/2021-01-13-LG-Announces-2021-NEXTGEN-TVS>

What TV Remotes Tell Us About Power Struggles in Streaming

<https://www.protocol.com/2021-tv-remote-branded-button>

Ampere: U.S. TV Households Now Average Four Streaming Services

<https://www.tvtechnology.com/news/ampere-us-tv-households-now-average-four-streaming-services>

TV Shipments to Dip in 2021 Despite 8K Surge – CTA

<https://www.lightreading.com/tv-shipments-to-dip-in-2021-despite-8k-surge---cta-/d/d-id/766556>

CTA: 2020 Record Year for TV Shipments

<https://www.tvtechnology.com/news/cta-2020-record-year-for-tv-shipments>

U.S. Consumers Going Bigger with Their TVs, NPD Finds

<https://www.tvtechnology.com/news/us-consumers-going-bigger-with-their-tvs-npd-finds>

Awards-Screener Streaming Apps Considering Filmmaker Mode Support

<https://www.hollywoodreporter.com/behind-screen/early-conversations-underway-toward-considering-filmmaker-mode-support-for-streaming-awards-screener-apps>

Goodbye and Good Riddance to the 16:9 Aspect Ratio

<https://www.theverge.com/2021/1/19/22238671/16-9-aspect-ratio-hp-elite-folio-dell-latitude-lenovo-thinkbook-plus-legion-7>

Best TVs of CES 2021: Brighter OLED, Mini-LED QLED, 8K and HDMI 2.1

<https://www.cnet.com/pictures/best-tvs-of-ces-2021-brighter-oled-mini-led-qled-8k-and-hdmi-2-1/>

The Best TVs of CES 2021: Samsung, Sony, LG, TCL

<https://www.digitaltrends.com/home-theater/the-best-tvs-of-ces-2021-samsung-sony-lg-tcl/>

Best TVs of CES 2021: Samsung, LG, Sony and More

<https://www.tomsguide.com/news/best-tvs-of-ces-2021-samsung-lg-sony-and-more>

CES 2021: LG Rolls Out OLED, QNED Mini LED and NanoCell TVs

<https://www.tvtechnology.com/news/ces-2021-lg-rolls-out-oled-qned-mini-led-and-nanocell-tvs>

CES 2021: Samsung's Huge MicroLED TVs Let You Watch Four Things at Once

<https://www.cnet.com/news/ces-2021-samsung-huge-microled-tvs-let-you-watch-four-things-at-once/>

CES 2021 TV Preview: 8K, OLED, MicroLED Screens Remain Huge, Hype Shrinks

<https://www.cnet.com/news/ces-2021-tv-preview-8k-oled-microled-screens-remain-huge-hype-shrinks/>

CES 2021 TVs Wrap-Up: Begun the Brightness Wars Have

<https://www.cnet.com/news/ces-2021-tvs-wrap-up-begun-the-brightness-wars-have/>

Dell Built a Range of Monitors for Video Conferencing

<https://www.engadget.com/dell-video-conferencing-monitors-2021-140016646.html>

Dell Reveals World's First 40-Inch, Ultrawide, Curved 5K Monitor Ahead of CES

<https://www.digitaltrends.com/computing/dell-refreshes-ultrasharp-monitors-ces-2021/>

Dell Unveils Its First 40-Inch Ultrawide Monitor

<https://www.engadget.com/dell-unveils-the-first-40-inch-ultrawide-monitor-140010677.html>

Every New TV Announced at CES 2021, From LG to Samsung

<https://www.techradar.com/news/every-new-tv-announced-at-ces-2021-from-lg-to-samsung>

Forget Foldable TVs. Transparent Screens Are the Cool New Tech Trend

<https://www.cnn.com/2021/01/12/tech/ces-2021-transparent-tvs/index.html>

Hisense's 2021 Laser Projection TVs Promise Better Colors Than OLED or Quantum Dot

<https://www.cnet.com/news/hisenses-2021-laser-tvs-promise-better-colors-than-oled-or-quantum-dot/>

LG Display's Transparent OLED Puts a Screen Between You and the Sushi Chef

<https://www.engadget.com/lg-display-transparent-oled-ces-2021-013947649.html>

LG Imagines a Bed with a Hidden See-Thru OLED TV Set

<https://www.theverge.com/2021/1/10/22223774/lg-transparent-oled-tv-display-55-inch-smart-bed-ces-2021>

LG OLED TV Evo at CES: Brighter OLED Is Coming, But How Much Will It Cost?

<https://www.cnet.com/news/lg-oled-tv-evo-at-ces-brighter-oled-is-coming-but-how-much-will-it-cost/>

LG's Transparent OLED TVs Are Now Even More See-Through at CES 2021

<https://www.cnet.com/news/lg-transparent-oled-tv-now-even-more-see-through-at-ces-2021/>

Panasonic's Latest OLED TV Offers Gaming Upgrades and AI Tuning

<https://www.engadget.com/panasonic-jz2000-oled-tv-142017932.html>

Panasonic Unveils New OLED TV at CES 2021 with Incredible Surround Sound

<https://www.tomsguide.com/news/panasonic-unveils-new-oled-tv-at-ces-2021-with-incredible-surround-sound>

Samsung Announces Massive 110-Inch 4K TV with Next-Gen MicroLED Picture Quality

<https://www.theverge.com/2020/12/9/22166062/samsung-110-inch-microled-4k-tv-announced-features>

Samsung Built a 110-Inch Version of its MicroLED 'Wall' TV

<https://www.engadget.com/samsungs-microled-tv-presale-korea-043149097.html>

Samsung's 4K and 8K Neo QLED TVs Are Powered by Mini-LEDs

<https://www.engadget.com/samsung-neo-qled-mini-led-160021037.html>

Samsung's The Frame TV Just Got a Killer Feature Other Sets Can't Beat

<https://www.tomsguide.com/news/samsungs-the-frame-tv-just-got-a-killer-feature-other-sets-cant-beat>

Samsung's Larger 'Frame' TV Can Now Switch into Portrait Mode

<https://mashable.com/article/samsung-frame-tv-portrait-mode/>

Samsung's Latest Experiments Include a Phone App to Calibrate Your TV

<https://www.engadget.com/samsung-c-lab-2021-experiments-154116592.html>

Sony Electronics Named CES 2021 Innovation Awards Honoree for Spatial Reality Display

<https://www.prnewswire.com/news-releases/sony-electronics-named-ces-2021-innovation-awards-honoree-for-spatial-reality-display-301193279.html>

Sony Finds a Home for Crystal LED Screens: Virtual Set Backgrounds

<https://www.engadget.com/sony-crystal-led-055541107.html>

Sony Introduces Two New 'Crystal LED' Modular Direct View Display Systems

https://pro.sony/ue_US/press/crystal-led-c-and-b-series-launch

Sony Is Going to Start Selling Its Mandalorian-Like Virtual Set Displays

<https://www.theverge.com/2021/1/6/22217554/sony-selling-microled-production-display-mandalorian-production>

Sony Unveils Mind Blowing Spatial Reality Display at CES

<https://gritdaily.com/sony-unveils-mind-blowing-spatial-reality-display-at-ces/>

Sony's 2021 TV Lineup Runs Google TV and Fully Embraces HDMI 2.1

<https://www.theverge.com/2021/1/7/22218693/sony-tv-lineup-8k-4k-z9j-a90j-a80j-x95j-x90j-ces-2021>

Sony's New Bravia XR TVs Are All About 'Cognitive Intelligence'

<https://www.engadget.com/sony-bravia-xr-tvs-cognitive-intelligence-180040870.html>

TCL Announces its Google TV Launch at CES 2021 to Offer Very Best Content with Superb Viewing Experience

<https://ces.vporoom.com/2021-01-11-TCL-Announces-its-Google-TV-Launch-at-CES2021-to-Offer-Very-Best-Content-with-Superb-Viewing-Experience>

Wireless Power Runs This 40-Inch TV Concept at CES 2021

<https://www.cnet.com/news/wireless-power-runs-this-40-inch-tv-concept-at-ces-2021/>

You Can Install Samsung's Latest MicroLED TVs Yourself

<https://www.engadget.com/samsung-microled-tvs-ces-160052013.html>

WI-FI 6E

TP-Link's New Router Lineup at CES 2021 Includes Wi-Fi 6E Mesh and Built-In Alexa

<https://www.cnet.com/news/tp-link-new-router-lineup-at-ces-2021-includes-wi-fi-6-mesh-built-in-alexa-wi-fi-6e/>

Wi-Fi 6E Arrives at CES 2021

<https://arstechnica.com/gadgets/2021/01/wi-fi-6e-arrives-at-ces-2021/>

Wi-Fi Industry Launches Next-Gen 6E Certification, and New Devices Are Up Next

<https://www.cnet.com/news/wi-fi-industry-standardizes-next-gen-6ghz-connections-ahead-of-ces/>

Wi-Fi's Biggest Upgrade in Decades Is Starting to Arrive

<https://www.theverge.com/2021/1/7/22212938/wifi-6e-rollout-starting-2021-smartphones-tvs-laptops-vr-routers>

WEARABLES

Best Wearables of CES 2021: Fossil, Amazfit, Honor and More

<https://www.techradar.com/news/best-wearables-of-ces-2021>

Best Wearables of CES 2021: Fossil, Amazfit, Vuzix, and More

<https://www.digitaltrends.com/wearables/best-wearables-of-ces-2021/>

These Are the Wearables That Stood Out at CES 2021

<https://gizmodo.com/these-are-the-wearables-that-stood-out-at-ces-2021-1846053707>

These Tunable Eyeglasses Let You Adjust Focus on Demand

<https://www.digitaltrends.com/wearables/ces-voy-tunable-eyeglasses-eyewear-vision/>

Lenovo Launches AR Glasses for Enterprise

<https://techcrunch.com/2021/01/10/lenovo-launches-ar-glasses-for-enterprise/>