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CORPORATE PARTICIPANTS

Cristiano Renno Amon *QUALCOMM Incorporated - President & Chief Executive Officer*

PRESENTATION

Unidentified Analyst

So thank you to Secretary Buttigieg. That was a great presentation. And obviously, we're so happy that he was able to make the time to join us, albeit virtually today. And as it says, government plays a critical role in supporting innovation that benefits society. And here at CES, we're getting a firsthand look at some of the technology that is going to drive and no fun intended there, but it's going to drive that change.

To tell us more about what's ahead, I want to welcome Cristiano Amon, President and Chief Executive Officer of Qualcomm and a member of Qualcomm Board of Directors. In a career with Qualcomm spanning over 25 years, he shaped the company's strategic direction, spearheading Qualcomm's 5G strategy and global rollout and has led the company's strategic expansion into new industries like automotive. So please join me in welcoming Cristiano to the stage.

Cristiano Renno Amon - *QUALCOMM Incorporated - President & Chief Executive Officer*

(inaudible) That's a nice step. Thank very much. Very happy to be here. Good afternoon, everyone.

Unidentified Analyst

And Brazil is well represented here today at CES, you're second Brazilian keynote speaker.

Cristiano Renno Amon - *QUALCOMM Incorporated - President & Chief Executive Officer*

Very good.

QUESTIONS AND ANSWERS

Unidentified Analyst

Yes. So -- but thank you for joining us. So I had the benefit of having a tour of the booth downstairs. And I looked at that and I said, "Okay, is Qualcomm a transportation company?"

Cristiano Renno Amon - *QUALCOMM Incorporated - President & Chief Executive Officer*

Why not? There's so much technology changes happening within transportation. I think just the automobile has been completely transformed. I think as we think about the core in the 21st century, it's a whole different experience. It's a computer on wheel. Auto companies are now a technology company. So it was a natural thing for a technology company like Qualcomm to be involved in automotive, and we're very excited about what we can contribute to that industry.

Unidentified Analyst

So that's great. And I encourage everybody, if you're having a chance to go check out downstairs, then please do so. So Secretary Buttigieg spoke about the importance of innovation and investment. Talk to us a little bit about how Qualcomm is focused on these areas?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

Yes. The company has really been built and everything we do is based on innovation. We have one of the largest R&D with the fundamental research, we create standards in a number of different areas within communications and processing. Our cumulative R&D investment today, it exceeds [\$73 billion] And we have been very focused in looking at technology disruptions. And as -- and how we could bring the benefit of connectivity and advanced efficient low-power processing to many industries, including the automotive and transportation.

And when we look at what's happening in transportation, a part of this story wherein everything is getting connected and becoming intelligent. We can talk more about that later, but traffic lights become connected intelligent. Cars are connected intelligent, bicycles connected intelligent, pedestrians through their smartphone, they carry a becoming connected and intelligent. And with that, you can build a completely intelligent transportation system as a whole that it's part of the broad digital transformation that we're seeing happening across virtually every industry. So it's a natural area for research and technology and a company like Qualcomm with our key assets is everything connectivity and everything, high performance in smart computing with low power, we see how we can apply those technologies and innovation to the sector as well.

Unidentified Analyst

Great. Great. So talk about the -- we've been talking at CES here for years about 5G. Talk us about -- tell us where we are in the latest in terms of the commercialization of 5G. And what kind of technologies and more importantly, like what kind of use cases should we expect to see now and in the future?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

I love talking about this. 5G, it's doing great. And we never had a transition of a generation of wireless that people come and say, why is it not here yet? Why is it not here yet. It's fascinating when we look about 3G, early days of 3G, early days of 4G, people asking, what do I do with the technology? Now people just want 5G, they want the higher speeds. We're seeing comparing to transition that we saw from 3G to 4G, 4G to 5G is tracking 2 years faster. We have now virtually every operator in the -- investing, deploying, planning or already commercial launch 5G. There's -- I believe there's now a total of 9 countries with 5G.

And what is unique about 5G is a technology that is being designed to be really a universal last mile access, not only for phones, but for everything, from computers, from virtual reality devices, augmented reality devices, connected cars and connected everything.

And I think we have a very exciting future ahead for 5G. It's the first time that the wireless industry now have a general-purpose technology like electricity. And then I'm going to answer your question about the use cases. But in the future, we're not going to talk about the use cases. We just can assume that everything is connected. And when it's not connected, that's going to be the exception.

Now let me talk about use cases and I want to bring the conversation to the topic of transportation. 5G has a number of applications from consumer to the enterprise into industrial. So on the consumer, the easiest thing to see is as has a very high speed, and it has the ability to be a reliable connectivity that you can depend upon, we're going to see new things coming to the consumer space. The same way the 4G democratize music, people don't buy CDs anymore. Some are buying vinyl back like, but that's a different thing. And you stream music, no matter where you are, you stream music to your car.

And even if you don't have a good connection, you have enough speed on 4G to stream music, that is what's going to happen with high-definition video in both directions with 5G. It's going to democratize video. And as you have a technology that has a high-speed low latency, and it's reliable, you're going to start to see other applications.

For example, mainstream gaming is going to become a streaming service, and it's going to be part of 5G. It's going to change social. As it changes all of the type of service is going to change the form factor of the device. We've been talking for a long time that augmented reality is going to be very important.

And we actually believe with -- in Qualcomm, we have this bold vision that the next computing platform that is going to replace your smartphone is going to likely be connected augmented reality glasses. And you can see how that can change with this technology use cases. For example, we use our phones to make -- to communicate with each other, it's fascinating to watch in the 2G days. It's about getting everybody with a phone 3G, you started to have data, and we will make phone calls like this. 4G area, you'll see everybody holding the phone and they're texting each other. But now what we saw within the last 2 years, the video telephony finally became a killer application. And people now talk to each other, holding their phones like that. That starting to change the form factor.

For example, it's no longer a technology challenge if you have an augmented reality glasses, and you're just going to have a call and you choose to move that quality or glass and you render somebody right in front of you, like you have a video call. So you can see how 5G as it gets mature, it's going to change a lot of the form factors as well as the new services. And that's why we also believe it has a huge potential to change social.

Now quickly, I'm going to shift to how we think about applications beyond consumer, beyond the phones. We see right now that work from anywhere. And what we learned through the past 2 years that you need a connectivity becomes very important and started to redefine those use cases sort of redefine what the computer looked like. #1 application on [PC] right now is communications, camera becoming important. Connectivity becomes important. CIOs know that you're going to work sometimes in their office, sometimes in their home or somewhere else. I want all the data to move to the cloud. You need to have the ability to high speed to access the data.

Another case of 5G that nobody talks about it. And it's super exciting is it democratizes computing power. As if you have a workstation in your office and you're doing like, for example, whether some engineers do you do advanced semiconductor development, you do VLSI design, you have a very high performance workstation. If you're going to go home, we only be able to take the workstation with you. So more and more, you hear companies like Microsoft with Azure, Amazon AWS talking about driving all the workloads in the cloud, you can do that. And 5G will make your computer just an extension of the cloud.

And then all the way to what exactly happening now in manufacturing, it's happening in smart cities, it's happening in retail. So 5G is really going anywhere. And I want to just finish that part of the conversation, give you some examples of how it actually changes within the transportation sector. One of the -- I know you mentioned when we're talking about then that you had a portion of your career work in British Telecom. So when a British Telecom, we start working with them on 5G in the launch, we did together a project that was the 5G connected ambulance for first responders.

So you have a high connectivity 5G, high performance and support mission critical. What the 5G connected ambulance could do is when something happened and the first responder show up. Within the ambulance, you can do high definition image exams, send over 5G to the hospital, to doctors they can watch over the panel. And then you -- the process of doing the triage and determining how to make the diagnostics and what's going to be required. You just get that whole thing...

Unidentified Analyst

It starts in the ambulance?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

It Starts in the ambulance. And you can see the power of bringing connectivity in advanced processing can really transform many things and will help us build an intelligent transportation network.

Unidentified Analyst

That's really fascinating. We're seeing a lot -- even some of the use cases that we're seeing here, like with the Indy Autonomous Challenge and the race cars. While we're focusing on entertainment and racing, it's the actual use cases and things that actually can spin out as well and what we

learn there is really fascinating. So let's keep on the area of like transportation and mobility. What -- can you talk about some of the other areas that you're investing in that area and some of those technologies?

Cristiano Renno Amon - *QUALCOMM Incorporated - President & Chief Executive Officer*

So maybe I'll go from what are we doing for the future of the automotive, and all the way to how the automotive now is part of a network of intelligent transportation. I'd like to think it that way. So one of the things we're doing, we announced in the show with it, we're getting more and more traction about the digital chassis. We're building a digital chassis platform for the automakers. And that's the right thing for a company like Qualcomm today. We have been successful, what we have done in mobile is about being a horizontal platform that allow all of our customers to innovate, build the platform for innovation and really build an ecosystem around it.

If you look at what's happening is some of the most valuable automotive companies right now, and it's because they have the technology capabilities, the car is really advanced connected computer on wheels. And many of the car companies are building and developing these assets, and they need the platform. So the car companies that succeeded over the past several decades were the ones that were building platform. They will build a unibody or a chassis, and they will take that across multiple brands. They take that multi-generation. They will develop combustion engine, like 4, 6, 8 cylinders. They take that up and down and left and right -- and they have those platforms that stay generation after generation.

They couldn't afford to do what expected from consumers, of course, in the future by picking individual components and look at electronics and digital as it was done in the past. They need somebody to build a platform, and that's what we're building. And we're very happy to continue to show momentum for a digital chassis with the show and includes basically all the capabilities that you need from connecting the car to the cloud, from a service platform as is a car connected, you have distribution of media, you have information, data analytics, you get to know your customer better and all of those things from the complete digital cockpit experience, how you interact with your car to ADAS and autonomy. And we continue to see increased traction for that, and we're very happy on how we can be the partner of choice of the automotive companies as they think about digital.

Now the second part of the conversation -- and where we have a lot of R&D is now think about this concept that this car now is part of a network. So the car is connected to the cloud is digital, but you have all the other cars and everybody else on the road. And that's a necessary step as we think about intelligent transportation. Now the car is part of this network. So the car using connectivity can connect to the cloud to every other car in the road to every bicycle, to every pedestrian connect to the traffic lights. And you can start to see how it changes in the benefits when you put this technology in place.

Let's talk about safety as a first example. We talk a lot about autonomy and ADAS. Let's say you're driving -- in your car, you have today, we all have a navigation system. You have your map. You show the GPS will show the car moving in the map. Sometimes you get colors, green, red and yellow about the traffic situation.

Now think about you populate that map in real time with every other car, direction of traffic, every other pedestrian, every other bicycle in the infrastructure, the traffic signs. The traffic signs doesn't have to be static, could be connected intelligent thing. So a car will tell you, please adjust your speed for you to get green next or there's many seconds for you for red or for green. The car will say in the next intersection, there is somebody coming at a higher speed than it should be. It should be breaking pay attention, alert, look at you as a driver to insert you within that network. And I think that's what we're going to see as this technology starts to come in and not every other car in the road has been to the process of transformation and everything is connected.

Unidentified Analyst

And just coming back to the concept of the -- it struck me the concept of the digital chassis -- to me was just -- it was so innovative and it did take me back to telecom time because as I think about everybody else looking at technology in cars, it's component parts versus the entire horizontal platform, which is fascinating. So you started talking there about personal cars evolving. Have you seen -- has the pandemic kind of reshape that trajectory of change in consumer interest in these vehicles?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

As for our view on the passenger car vehicle, I think the -- it's not -- I wouldn't point to the pandemic. I will point to there -- we have coming from a Qualcomm viewpoint, we have a very mature mobile society today. We're all connected or smartphone or a separable device. It was very easy for us to see what we needed to do to become a leader in digital cockpit because people will drive their cars looking at their phones, they shouldn't be doing this, but that's because there's more information that is relevant to you when you're behind the wheel of the phone.

And I think what happened is consumer course today, one of the most important buying decision is how do they interact with the car, the digital cockpit experience. That's more than anything is changing how cars are designed. To the point that you look at new car buyers, it's all about the technology in the car versus other criteria that we saw in consumer decision in the past. And I think that is the biggest transformation we're seeing.

Unidentified Analyst

The biggest change, yes. So Qualcomm leaders have talked about the driver of the future. What does that mean? Explain that to us? And what does it mean in terms of how cities would change to respond?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

We think that technologies, for example, such as ADAS, should be as pervasive as ABS and airbags. There's no reason why you should not have this in every quarter. Actually, I will argue, I'll tell a little bit of a story, bringing back, I think, our respective telecom experiences. For safety reasons, for safety reasons, the United States government has decided to, for E911 to mandate GPS and every phone. That decision created a revolution of technology innovation. Once you have a GPS and every phone, you saw what happened. There will be no Uber, if there was -- there will be no ride sharing if there wasn't a GPS in every phone.

So we think that there's opportunities also when you think about the driver of the future and safety to have those technology, we love to have, for example, car connectivity to each other car, the traffic lights, pedestrians and bikes to be mandated because actually, all of a sudden, you build a network of those connectors, and that's going to change the driver experience. Whether you're driving or whether you're going to rely on autonomous assisted driver systems, you're going to get monitored. As for everything else the networks get monitored and we're going to try to drive to a 0 accident future of transportation.

Unidentified Analyst

So what are the key challenges smarter transportation system? And how are you working to overcome those?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

I will say the challenge number one -- and I'll point to some of the conversations we had at about 5G is you have to get it deployed. You had to get it done. You have to get the larger percentage of cars to be connected with the technology with those systems. So it's just time and the ability to get partnerships between not only the private sector, but with the public and governments to see the benefit of the technology, and then make it easy to get adoption.

There is no question that we're seeing a complete transformation of the automotive industry and transportation. There is no question we see services are changing, how people think about the use of the car, what are the role of commercial vehicles, how that it becomes an essential part of the whole e-commerce culture that we have. And there is an important role the technology needs to play. We're just going to get technology in every single car.

Unidentified Analyst

We're almost there. So I'd like to kind of just change track slightly. We've talked a lot about technology. I also want to talk more about Qualcomm. So I have a chance to spend time, I met with your CMO yesterday. Everybody at the Qualcomm is like hugely passionate about their job, which I just -- I love. But let's talk a little bit about digital inclusion and sustainability because those are major topics of discussion, both here at CES and across the business world. How do these factors influence your approach to product development and future planning? And also just tell us about that ethos at Qualcomm?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

All right. Well, very good. So maybe we'll do that in reverse order. And the whole conversation about sustainability. I'll give us some statistic. But as you deploy technology such as 5G and you get the pervasive across not only phones, but cars and everything else. There are studies that show that just on the current track, just in the current track. By 2025, the reduction in greenhouse gas emissions will be equivalent of taking 81 million cars off the road for a year.

And in overall, when you think about overall in the United States will be the equivalent of having fuel efficiency improvement by indoor of 20%. That's massive. One of the -- I've been into the CES for many, many years. And you can see, as you follow CES, I have the privilege to been working in the wireless industry to every generation of wireless. And as you see in CES, you see the show in the companies and the products evolving. One of the biggest contributions of the wireless industry for sustainability, and we don't get to deserve credit. It's the amount of electronic devices that got incorporated into the smartphone, it's incredible, right? If you look -- the smartphone right now, is the consumer electronic device is your portable video player, is your musical player, is your camera, is your computer is everything.

So I think in general, technology has done a lot in this area, and there's a lot more to be done. As we build the process of connecting everything in the Connect Intelligent Edge, as we get everything connected to the cloud, 100% of the time, we're going to see further efficiency gains, and we'll continue to see the benefits. And then I'm going to lead that into a conversation about -- how do we continue to bridge the digital divide. We're very proud because what the wireless industry have done. The smartphone has -- it was not like one computer per person.

The smartphone was how many countries got access to the Internet for the very first time. How people became connected to the Internet for the very first time. In some of the countries that had access to digital later, we saw that the mobile Internet developed faster than the traditional Internet. So the role, I think, of connecting people and bridging the digital divide of the smartphone is massive.

What 5G is going to do now is going to take that further. And that's why we always believe in the potential of this technology because you can democratize computing power. You will be able to have through the cloud, and the ability to use 5G as something that connects to the cloud and allow you to tap on demand to the computation of power on the cloud, it's a computation on demand. You have access to the computation and power to do anything you want, for people, for entrepreneurs, for creation, for productivity. And I think that's going to be another very important step in bridging digital divide.

Now I'm going to answer your question about Qualcomm. Look, Qualcomm is -- I'm very biased. I love this company has been -- I joined the company as an engineer back in 1995 before the very first CDMA launch. And it's a company that is very focused on technology. I tell people, if you really want to work in wireless, if you want to work in advanced low-power computational platforms of the future, I think there's no better place to be. It's really an engineering culture, but more important than that, people at Qualcomm that what we do can make a difference in the society. And you can see the fruit of that work as the whole society gets transformed by the technology, and I think that's what keeps us going.

Unidentified Analyst

Great. So we've got a couple of minutes left. And actually, as Cristiano actually, that was important that we could actually open this up to questions, because you guys have all made it here to join us in the room, which we really appreciate. So I don't know if we've got a microphone anywhere, but you might just have to raise your voice, but gentlemen on the front.

Unidentified Participant

Yes. I'll try to shelf out. My name is Ken and I'm the (inaudible).

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

Okay. We'll do.

Unidentified Participant

I appreciate we are telling this great story, and I think you guys have thought a very good positive story. When it comes with challenges and challenge. I think you asked a question about it, but I think what I would like to ask for Cristiano here is with the challenges and the threats of cyber (inaudible) the motivation that go beyond a (inaudible) Interest, political, geopolitical kind of stuff -- level of connectivity, which is exactly what you're talking about is that we get the greater the cost the connectivity, the greater the risk have (inaudible) Does that make you (inaudible) to the point that it does (inaudible)

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

Look, this is a great question. Actually, thank you for asking this question. The reality is, we are today in a global interconnected society. That's the reality. And I think that the direction it will be continued to see things being more and more connected. I don't -- I'll be honest this exactly -- it is a huge challenge, but at the same time, there is a challenge, it's a huge opportunity. There never been more awareness about the importance of cybersecurity now than compared to the past. And right now, it is driving companies like Qualcomm to develop technology with that in mind.

One of the largest investments, and I think is another area that we don't have a -- don't get credit for. We -- one of the biggest, I think, technology innovation when we talk about our next-generation Snapdragon, and we announced it back in December was what we're doing on the security standpoint, and how we apply artificial intelligence and the knowledge that you have of the user to actually to protect the user.

So I believe that tech companies that are going to be selected as the trusted partners, not only for their customers, but the society and the ones that are going to take security very seriously. And the fact that we have a larger surface area, it can also be an opportunity to make sure our cities and our companies and our information is safe. The awareness that exists right now and importance of privacy of user data and how do you build reliable platforms and safe platforms, I believe it's going to create a leapfrog in innovation on the security standpoint.

Unidentified Analyst

Great question. Any other questions?

Unidentified Participant

Can I use the microphone and ask the question. Hello. Yes. Hello. Here I am.

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

I can see you now.

Unidentified Participant

Yes, nice. Thank you for a fascinating session. A (inaudible) Founder of Copernic Space, we are using blockchain NFTs to finance space innovation, which is so difficult to finance, I'm sure you know. I would love to invite you to visit one of our locations next to Qualcomm, where you can see innovation of sending to the moon 5G network. Actually, the company that we collaborate with and wants to finance Lunar Outpost already has Nokia signed up to try to test 5G network on the moon. Copernic Space is helping with it. We would love to see if Qualcomm could join our American Quest to bring this technology where the next economy resides may we invite you?

Unidentified Analyst

So what do you think of space?

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

Okay. Thank you so much for the invitation. I'm going to use the opportunity here as a question to mention something, which I forgot to as we think about use cases of 5G and things like that. You mentioned blockchain NFT.

Unidentified Participant

Yes.

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

So one of the things we do at Qualcomm, we're trying to look at things beyond the next immediate expectation of technology about what the technology can do. And it's interesting, when we announced back in just December last year, our latest-generation flagship Snapdragon, the 8 Series Generation 1 for mobile. We announced a feature. It was interesting. I didn't get a lot of -- generally the industry will think about the overall performance and camera all this. We announced for the first time that your smartphone can mint your NFT at the smartphone and allow creators, because we believe we're 5G, everybody will be a professional broadcaster, everybody will be created with high speed. We're enabling everybody to have a 4K or even a 8K camera or speed and you can actually meet your own NFT. It's about really empowering and democratizing the computing power.

Now you mentioned about space. I think there's a lot of interesting things coming with technology now in 5G, there is the ability -- part of the [3GPP] standard to have satellite-based communication as well. And of course, we're super proud that we send our snapdragon to Morris as part of the Morris (inaudible). So thank you so much for the invitation. I appreciate it.

Unidentified Analyst

Sorry. And I'm just -- I'm going to have to wrap up there because I'm getting the sign from the back of the room that we're over time. But thank you all for joining us today. Thank you, Cristiano. I just love your passion and enthusiasm for what you do. I've been scribbling furiously on all your predictions. But the democratization of computing power is going to be a key, but more importantly, the connected augmented reality classes. You heard it here first, that's the prediction of the future for consumer applications. So please join me in thanking Cristiano for the presentation.

Cristiano Renno Amon - QUALCOMM Incorporated - President & Chief Executive Officer

Thank you. Thank you so much. Thank you.

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