



### **S03E04: Demystifying the autonomous vehicle with Applied EV**

Julian Broadbent (00:03):

There's some easy gets for sure, but where it really gets hard is when you put that complete software defined machine into an operating environment like a public road or industrial application. And that's where the challenge is.

Kyle Fox (00:28):

This is a Smarter World Podcast, focusing on breakthrough technologies that make our connected world better, safer, and more secure. I'm host Kyle Fox. Each episode we introduce bright minds in their approach to a more sustainable world. We discuss the opportunities and challenges they face and how technology can change the world for the better. We're tackling a couple of topics today, EVs and software-defined vehicles, and there's no one better to discuss this than Julian Broadbent founder and CEO of Applied EV. Applied EV is a pioneering Australian-based company leading the charge in software-defined autonomous vehicles. From software-defined features to groundbreaking advancements in battery technology and autonomous driving systems, Applied EV is at the forefront of the electric mobility revolution. Welcome, Julian.

Julian Broadbent (01:14):

Thanks a lot, Kyle.

Kyle Fox (01:15):

Julian, you've had a very deep and wide-ranging career in the automotive industry for sure, and I was wondering if you could share with our listeners a bit about your journey and your involvement with Applied EV. How did you arrive there?

Julian Broadbent (01:27):

Yes, I think unlike a lot of professionals, I've really only had two careers. The first one was at General Motors and it was nearly two decades. Tremendous experience, also an exciting time for automotive. It was emerging out of very traditional mechanical product type solutions and it was starting to lean into IVI, in-vehicle infotainment. It became a connected car. It started to as an industry over those two decades, it, like other devices and products in our world, they started to head towards software. I was fortunate enough to be part of the industry as it went through these changes, but one could not help see that the auto industry wasn't keeping pace of other products and their adoption of heavy amounts of software to



create value for customers. It became very compelling when I had the opportunity after an executive role in North America to repatriate to Australia and begin a journey with Applied EV.

Kyle Fox (02:34):

So Julian, in 2015 Applied EV was established with you as Chief Executive Officer. Is that right?

Julian Broadbent (02:41):

In terms of Applied EV, we actually incorporated the business in 2015 and I've been CEO for all of that time and we built a team up from essentially two people. So we didn't have high expectations when we began Applied EV. We were very curious, my co-founder and I, about the world of future technology and vehicles. We didn't quite understand at that time how it would become such an important thing today, nearly 10 years later. So yeah, it's been a great journey.

Kyle Fox (03:18):

That's the true definition of a startup and all that you've accomplished. And when I was listening to you talk about your career at GM, and I was trying to think of my own experience as a consumer is that it did feel for many years there that there was a hardware thing called a car. And I don't want to insult the car companies by any means because it's amazing what has been produced, but we've been bolting new technologies as they came in and I get the sense that that would be straightforward as cell phones and connectivity evolve, maybe not as quickly as they do now, which is at light speed. And so I think that you are in a great position to start from more of a software century viewpoint and it sounds like the timing is perfect for it. And let's start unpacking a little bit of that and dive right in terms like ADAS and autonomous driving safety EV. These terms tend to be talked about a lot, but often for the layperson or even somebody that's in the know, it tends to hit it at high levels. So you see a lot of attention about robotaxis for instance. So I wanted to ask what are some of the misconceptions about autonomous driving that applied EV is tackling?

Julian Broadbent (04:20):

I think we're starting from the right point of view by trying to understand the auto industry that is ultimately bringing the products that we will use to market in terms of autonomous driving that really originated out of a more Silicon Valley military type industry. So what we're really talking about is the coalescing of new technology and existing products with nearly a hundred years of experience. And they don't in the first instance, immediately become a solution. And there's reasons for that, although the public will see both sides, they'll see technology companies like you said, have been very public about the robotaxi idea, but you might also notice that automotive companies have not been very public about the robotaxi idea.



And it's not like they will never come together. It's just the mindsets of how these sorts of opportunities like robotaxi will evolve. It'll actually take all the things that automotive needs to consider, such as safety, regulatory frameworks, high volume production, delivering a product that actually works every single time without a single failure.

(05:34):

That's the mindset of your auto company. They're paranoid about a 2 cent part stopping a car in its tracks and having major recalls. So then you overlay that mindset with something that's brand new and it's been developed in human test beds and you've got this mismatch of cultures of ideologies around how technology can evolve. And of course there's one example with our Tesla friends where they're trying to do both at the same time and I think they're having some success in stirring the soul, but back to the Applied EV's approach.

(06:08):

Because our company is more or less based on automotive engineering experience, so we are not really a Silicon Valley company. We look a bit like a Silicon Valley style tech company from the outside, but I think our roots are in automotive. So we bring a lot of the mindset of understanding that safety element, that regulatory framework. And so in some ways we're developing technology but in other ways with figuring out how to create the solution that will fit a regulatory framework that may also just be evolving and not exist yet because we believe that's the important factor for unlocking the commercialization of these important technologies.

Kyle Fox (06:54):

We talked earlier about how, my example was we layer in some new technologies as cell phones, and what I'm hearing you say is the power that you guys are bringing is anchored in automotive. And so you're not a startup that's coming in and saying, "Hey, I got a great idea." You understand that there's going to be regulatory challenges here, and I love what you said, you're talking about a future not just like the tech that's going to do, but we need to invent new ways of being able to regulate these vehicles because we're not ready for it and the civilization is not ready for having all of these vehicles out there, running around autonomously. Is that what really the point is?

Julian Broadbent (07:27):

Yeah, it is. The challenging part around applied EV creating this important technology we call the digital backbone. It's essentially the control system that enables vehicles, or machines for that matter, to run entirely on software. And I think some people look at vehicles that are software-defined as very much about the cockpit experience, what we call in-vehicle infotainment. But at Applied EV we see a software-defined vehicle every single function



including motion control, including doors, including all of the features that you would have in either a logistics vehicle or a regular vehicle. Every single feature must be controlled by a computer. And there's some easy gets for sure things similar to your handheld device and in-vehicle stuff, but where it really gets hard is when you put that complete software-defined machine into an operating environment like a public road or industrial application.

(08:29):

And that's where the challenge is. And the autonomous technology group, which is essentially in most parts, it's from a different mindset altogether, which is great. It's been really healthy for the auto industry, but now we're creating a platform that is receptive of autonomous software because autonomous software is trying to control a vehicle, and if the vehicle is not 100% based on software, then we have a gap and that gap is what we're solving.

Kyle Fox (09:00):

The solution is receptive to software. And what immediately popped in my head was change. And when I think of software, one of the benefits, obviously a hard-coded solution can't change and if you need to do an update, but being receptive to the idea of software and putting those, not even boundaries on there, but you went all the way down to the mirrors, right? You're saying, "Look, if there's something in here, it needs to be software controlled." And if you start from that point, then I would imagine that opens up a whole new realm of maybe some of these new standards that we need to be able to create because the fundamental assumption of where you're coming from is different. Is that really the point there?

Julian Broadbent (09:35):

Yeah, what we're talking about here is execution to bring a product to market at scale. That's what we're trying to do. And auto companies are the best in the world at bringing really big products to scale at high volume. They do that very well. But the autonomous software element, it's still nascent in its perfection or its reliability, so it's never really been implemented at scale yet. I think nearly all of the on-road autonomous activity today in the world is approximately 1000 vehicles that are driving around in test beds. That's about the size of a test fleet at an auto company, not production. That's about the size of a test fleet.

Kyle Fox (10:17):

For sure.

Julian Broadbent (10:18):

So it's amazing what's happening. It's obviously creating a lot of public awareness, a lot of public opinion, but there's going to be a point on the timeline, on the continuum of, "Hey, we



need to actually deliver this as a product at scale that's reliable and it meets standards." Applied EV is essentially preparing for the future. It's preparing the right electronics that go inside vehicles and also a cloud platform that's once that autonomous technology which is created outside of our company. Once it's ready and it's more mature, those autonomous tech companies are going to want a vehicle that they can deploy that on to realize their business case, which is going to be based on scale of software. Applied EV's technology, once installed in an OEM product now unlocks the huge amount of effort that's been pumped into this industry. That's what gets us out of bed in the morning.

Kyle Fox (11:12):

If we come from that original premise of we're going to make this software defined all the way down in the mirrors, my term, then that's where in the high-tech industry scale is repeatedly shown. When you can actually standardize something to an extent, it actually doesn't limit innovation. It actually causes it to explode.

Julian Broadbent (11:28):

Correct. So in some ways we see our technology as the non-sexy part of the autonomous vehicle value chain, but it unlocks it. We get very inspired about what we're doing, but sometimes you've got to look in the mirror and look at the strengths and the DNA of your company. Our strengths are actually in that gap between automotive and control systems. That's essentially what we do, but that has some tremendous benefits. It means we have now a unique place in this continuum. There aren't too many companies that are doing what we're doing, and it's not just the gap in terms of the migration of a traditional vehicle to autonomy, it's actually a gap in who in the world is creating these important blocks of technology that are going to unlock this total solution.

(12:16):

And auto guys are auto guys and they run on a five to 10 year cycle of refresh and update, and it's obviously a highly regulated environment. They could probably go much faster if they wanted to, but that's what their business is. And then you've got the autonomous tech guys doing mainly software and then you've got a whole ecosystem around autonomous navigation as we would call it, and there's a whole range of products there. But then there's this missing piece and the auto guys look to the traditional automotive supply chain called tier one and tier two suppliers, but their business model is linked in to supplying automotive, which is on a five to 10 year cycle.

(12:57):

So there's no real incentive to create... I mean obviously I'm not saying nothing's happening at all, but there isn't that myopic focus that Applied EV has in this very important bit of



technology. And so that's what inspires us is we feel like we're creating that very important piece to see software in our world with autonomous vehicles.

Kyle Fox (13:18):

That's a great example of what I was saying earlier. Some concepts they tend to stick out like robotaxis and there's fascination about certain aspects of how this thing comes together. But you were mentioning earlier your digital backbone is the thing that you're building that is getting your team out of bed every morning. Can you give us a little bit more detail about what is a digital backbone within the context of what y'all are focused on?

Julian Broadbent (13:39):

So the digital backbone represents the compute platform that is integrated into an OEM vehicle, an original equipment manufactured vehicle. So we don't build the cars, we don't build the trucks. We work with OEMs to do that. So the digital backbone is essentially integrated as the brain and control system for the hardware that we call a vehicle. And it has a very specific job, which is to allow the autonomous driver, which is a software solution, to interface with the vehicle and control the vehicle.

(14:17):

That means now we have a product that is ready to do a job. And so the digital backbone also provides a cloud platform, so it now connects the car to the cloud, it connects the, in our case it's mainly trucks. We haven't talked about that yet, but it's mainly trucks to car. We like logistics. So we now have these autonomous ready trucks. We connect them to our cloud platform and that in effect is connected to the logistics software platforms as well. So the digital backbone is a compute platform that lives inside an autonomous vehicle and it has two main jobs. One is to enable the autonomous system to drive the car or the truck in our case. The second job it has is now to connect that vehicle to the customer's purpose. And this is what required we think, but to give the vehicle real meaning and real purpose.

Kyle Fox (15:13):

I'd love to unpack that a little bit more. What are the customers that you're really going after? You mentioned that you're focused on trucks and that sort of thing, so things like mining and long-range transport came to mind, but could you unpack how's that digital backbone working into what customer categories you want to go after?

Julian Broadbent (15:28):

We were talking before about the rest of the world and the evolution of software in other industries, and if you look at something like the logistics industry, they rely on a lot of software



infrastructure to support their businesses. They're trying to move packages from A to B, They're trying to do scheduling, they're managing their warehouses and in other industries like mining, it's the same in mining. They run an entire mine site on a software platform. These are all data-rich companies now. They're very heavily reliant on data.

(16:03):

But today in, say the automotive world where we're focusing, we're basically bringing an analog solution like an analog truck with an analog driver, and we're seeing it inside these digital ecosystems almost as an anomaly. It's very expensive for our partners in the logistics sector. I think if you look just as an example, if you look at Amazon or you look at Uber, etc, who are obviously software-based businesses, their highest line items in their cost book is the cost of the driver in the vehicle and running that particular side of the business. And I think that's the same for every logistics business in the world is they've been able to reduce costs everywhere. But yeah, you can imagine the win-win kind of scenario you've got where you've got this genuine pool for logistics companies, for digital solution that can make perfectly, as we all know, software has the ability to make things perfectly in a digital world. That's the value of having an autonomous vehicle in the industrial commercial space.

Kyle Fox (17:05):

I love what you said is you're bringing an analog device to a data-rich world. We're trying to shoehorn a square peg into a round hole and your whole point is to turn that right around. You mentioned about the cost. I didn't realize that one of the top line items, it should have been obvious to me that the driver and the vehicle and that sort of thing. And if that's such a cost line item, autonomous driving it's gonna have to develop, it's going to reduce their development costs and their deployment costs. I think of humans, I think of there's downtime, there's sleep, there's safety for the driver, there's insurance. All these things, in some ways, go away.

Julian Broadbent (17:40):

Yeah, you are correct. The reason that I think your traditional driver and your traditional vehicle, which is analog and the Applied EV solution working with our OEM partners and with our autonomous partners is now a digital solution. The reason that the analog solution is so expensive is that when you're trying to create huge scale, which we know software has the ability of being able to do and not letting costs get out of control and being able to actually create immense value, but when you have an analog element like that, a high cost analog element in your business model and you want to scale it to infinity, it becomes insanely expensive.

(18:22):



But when you have a software-defined product, or an autonomous one to be clear, you can now scale that product very efficiently almost in the same way that you can scale software, but obviously there is a hardware element, the vehicle itself. But as we know just talking about the business model, the cost of the vehicle can quickly get amortized over its lifetime and it's much less cost than a driver. That's what I think is the pull in the ecosystem now is that we've got a digital world, we've got these traditional machines, and once they're made digital, we can unlock tremendous value for companies that have this conundrum.

Kyle Fox (19:01):

I'm going to use the term user experience, but I don't mean it as a driver because these are autonomous vehicles, but Applied EV's approach here should be able to give an outstanding user experience. Because the user is saying, "Look, I have this type of thing that I want to have on top of this platform because I'm in a mining environment. I need to have different techs that I'm going to need if I'm doing transport," that sort of thing. Can you unpack that a little bit? How does an OEM look at this from a, "Wow I can actually do my own customized thing," and focus on that value.

Julian Broadbent (19:28):

The consumer experience for a fully autonomous vehicle is different to that of one that you may drive or may not drive. I think that's more on what we do today. We're talking about a vehicle with no cabin when you remove the cabin from the vehicle, the interface points are now with our customer, the logistics company or the industrial company we work with or their consumer. That's the touch points if you like. One of the fun things that we're doing at the moment is we're trying to understand what does it mean for both the consumer and our customer to have essentially a robot in their business model or in their lives and what are all the details that need to be figured out? So on the customer side, which is running a fleet of vehicles that's quite simple to synthesize. The vehicle autonomously docks, it is loaded in their traditional method, it's connected to their warehouse management system and their scheduling system, maybe even their SAP. It's deployed on an autonomous route.

(20:30):

It then begins its route and starts to deliver either a package or a product or a service. So then you get to your specific question, which was how does the end consumer feel about a robot arriving at their curb or in their business? That's where it gets interesting because a vehicle will sit there and we need to create an interface. That's where our cloud platform is very important. We need to create a digital cloud experience for that consumer to now access and communicate with the vehicle. Most technology companies are trying to solve problems, and I don't think automotive has come up against this problem yet. We've come up against this problem. When you spend time with a vehicle with no cabin you realize that it





doesn't move without software, and so it needs interaction with consumers. So it has to really synthesize with an individual consumer.

(21:20):

There are many consumers in these sorts of business models. You have a logistics company and their one to many kind of model. In the consumer world, you get all sorts of different perceptions of what this machine will be. So you're trying to make it serious, very interactive and very data rich. I think people having good awareness of what the vehicle's doing, what it's planning to do is an interesting area that we're working on and creating untapped value. One of the big areas of value that we find with an autonomous logistics solution is that it's different to the traditional analog one because it's not in a hurry. I don't think anyone's met a logistics driver and a van that isn't on the clock. So we find it really interesting that there's untapped value in the idea that because the cost base is now so low that the consumer now is having an experience that isn't rushed and they don't want this person to quickly disappear off their porch.

(22:16):

It feels a bit like a new frontier with the idea of an autonomous logistics vehicle delivering you a package in a whole new experience. You're not having to sign something with a quick scribble that doesn't mean anything as they run out the door. You're actually maybe even able to browse other products. You may be able to look at your account that you've got with the logistics company and you maybe even just have an experience with the logistics company that was normally only on a laptop screen or on a handheld device. We don't know exactly what sort of value we can create for the consumer, but we know it's going to be different. It's going to be better.

Kyle Fox (22:53):

One thing we could unpack a little bit here on delivery is everything you talked about there was last mile delivery, right? My parents are getting on in age and there's a lot of folks that age in population, and it doesn't have to be just aging. There could be areas where people don't have the ability to get into transport, but they still need maybe any medicine. They need to have equipment being sent to them, whatever. So that last mile delivery is such an important part and I think that's what you're describing is that's exactly what we want to do and we're not even sure what new value it's going to come up with, but it's going to give us a platform to allow people to innovate and do something with, right?

Julian Broadbent (23:29):

The last mile delivery is always a fun topic because it's visceral for the consumer. We now have a robot coming to our house to deliver us a pizza or a sandwich or a box that we



ordered from an online store, and I think we always get excited about that, but at Applied EV, we're actually just as excited about the non-consumer opportunities as well. We like B2B a lot as well, and a lot of our customers are very interested in first and middle mile and it's very dry and it's all about costs and efficiency.

(24:09):

And so when you've made that hyper jump to a digital software-defined vehicle that is running autonomously and it's a full-size truck, you don't have to be limited by the laws around an eight-hour driver's shift. Now you can now run a triple shift on that, whether withstanding recharging or refueling. But now the logistics companies that are running B2B models where they might have a big DC and they were going to a mini-DC distribution centers, they can now run triple shift on these things. They can choose any time of day or night. So you're removing some of those traditional boundaries to running a business efficiently by going to a digital solution. And we also get excited about that as well.

Kyle Fox (24:51):

You actually have the ability to slow down and not be at rush because it is software. It is something that's managed and you can manage these fleets to arrive at the right time because about throughput as opposed to the got to be there in 30 minutes to deliver something or I'm sure that comes into it. So I got to assume that there are some significant environmental and sustainability benefits. Can you talk a little bit about that?

Julian Broadbent (25:16):

Obviously an electric truck or an electric vehicle is great for software. Software does a really good job of controlling things that are electronic. Software is terrible at controlling a mechanical thing. In fact, if we have a mechanical thing, we actually have to make it electronic to be able to control it with software. The idea of electrification versus hydrocarbons is interesting. Now, customers are still looking at very thin margins today with their analog drivers and then they're trying to meet their ESG and decarbonization mandates and they can do a little bit around the edges. They can put solar panels on their roof, but to make the big jump to an electric fleet, we're talking 50,000 vehicles in some of these logistics companies. So they're huge fleets, but the incremental cost for an electric truck versus a hydrocarbon truck is very high and when erode the very skinny margins they're operating at today.

(26:13):

But when you introduce a lot of this software-defined vehicle solution that is unlocking autonomous driving, which is a major part of it and it's going into their existing digital infrastructure world, all of a sudden electrification starts to make sense just from a total



operating margin that you can now afford EV. But that's not the only way that I think EV can be adopted. Again, we were talking about the challenges of having to operate every single aspect of the vehicle with software. If you've got a fleet of autonomous trucks and they're running on hydrocarbons, how do you automate refueling? You've got this amazing digital solution. You've got digital warehouse management, you've even got digital fulfillment. A lot of warehouse companies are going to robots inside their warehouses. You've got automated loading and then you've got your automated vehicles with their amazing autonomous tech and then you've got to get some guy to go and refuel the diesel truck.

Kyle Fox (27:16):

You got to go stick the pump in there.

Julian Broadbent (27:19):

So that's the enemy of a digital world is introducing an analog element. And - Particularly from the business side. So one of the benefits of electrification is that you can do automated charging because it's not mechanical. It's electronic. There are various methods of charging EV trucks autonomously. In fact, I would say most trams or trains in the world today are a really good hint of how you do that.

(27:48):

So there are ways of charging huge fleets of electric trucks. So now you've got the ability to charge them on the run, charge them while they're loading. You're starting to ratchet. You're not solving one problem at a time. You're actually creating more value because you, you're doing it while you're doing something else. But I don't think there's any truck that's being refueled at the same time as it's doing a job. I don't think it's too hard to visualize the progress that's been made today in the world of logistics going digital and then introducing these digital elements that are ultimately unlocking it. So the whole value chain becomes digital. The margins are much better for logistics companies. It's a real game changer. What I really love about all of this, none of it's pushing a rope. And I think sometimes pushing EVs is like people want to do it, but it's just not fitting into the business model. And I know there's ways of doing that, but if it just makes sense and it's the right thing to do, the take up will be instantaneous.

Kyle Fox (28:47):

It closes the loop here in that cycle. It's the more vehicles we get on the road, there's fewer accidents, more fuel efficiency, all the economies of scale you have there, but it's a desire, it's not a, "Hey, you should do EVs." This is actually, "Oh wait, this is actually going to be higher margins than I can spend that money on something else." And what you're describing is a self-reinforcing cycle.



Julian Broadbent (29:06):

We're talking about going with full circle here, which has been fun, but the value of what the guys in, I say Silicon Valley, it's just a euphemism for technology companies. The autonomous driving movement that was created out of passion and out of thinking about safety by an industry that wasn't automotive is fantastic. And the automotive ecosystem, including the OEMs and the tier ones, they're equally energized by this too. But the whole idea that in our lifetime we will see the full digitalization of road going logistics and maybe road going passenger vehicles, it's going to create much more value than you get to sit in the backseat and watch a movie on your phone. It's going to create a whole lot more value than that. That's one of the reasons why we don't really focus on robotaxis is we can see that the logistics and the industrial industries have real challenges, have real challenges today.

(30:02):

And the ability to start small with those companies and to grow to the ultimate solution that I was describing there where the whole value chain is completely digitalized across to all of the different segments within logistics is great, but it's going to take some time. But there are some parts of that value chain that we can do today. So we can begin the process today. We can start to bring our autonomous partners into a world where they're commercializing their technology, which is hard to do with robotaxis other than charging a few dollars a ride on a test bed.

(30:37):

The ability to start doing commercially and getting past R&D, that's a big jump. They call it the valley of death in the innovation cycle. You've probably heard of that. So trying to bridge that and get that first instance of some scale of an autonomous truck or an autonomous vehicle beyond 500 or 1000, that's going to be really important. So the industrial sector and commercial sector, we believe has a much better chance of doing that for what our philosophies around safety are. Say compared to robotaxi, which it's either going to work or it's not. You can't half do a robotaxi.

Kyle Fox (31:17):

You're focusing on something that actually has a need and there's actually solid bones behind why you'd want to do it. But I understand that y'all had a very eventful CES last year. Applied EV unveiled a line of commercial electric vehicles called the Blanc Robot. And can you unpack this a little bit, tell us what happened at CES and what you were showing?

Julian Broadbent (31:37):



We've talked about the idea of removing the cabin from a vehicle and visualizing that. And I think first of all, the products that we showed at CES, they're a very small form factor vehicle, so they actually enable us to achieve that first step that I was talking about earlier. A smaller vehicle is much easier to deploy as a first instance as an autonomous vehicle than say a forty-ton semi-trailer. Obviously there's companies that are doing that and they're doing that quite well on some highway applications. Our view of the first deployment is not so much testing the autonomous driver. Our view of the first deployment is there is a customer and they want to complete an end-to-end delivery to an end point. It could be a consumer or it could be B2B.

(32:26):

And what we showed at CES was a vision in a very small form factor of what these vehicles would look like without a cabin. And so it creates a good conversation. It's inspiring for us and our customers to be able to visualize these software-defined machines that can do these jobs. And also working with our major OEM partner, Suzuki Corporation, which is famous for doing vehicles of about that size that we showed at CES last year. We're actually been working with Suzuki for a number of years now. They actually have a platform that is capable of us manufacturing that exact vehicle that we showed at CES.

Kyle Fox (33:06):

Really?

Julian Broadbent (33:08):

And... Yeah, it's starting small. It's finding the right entry point into the market where we can create real value with real vehicles and everything that we've just talked about. So yeah, CES was a hint of what the first vehicles will look like that we're going to deploy commercially.

Kyle Fox (33:23):

I saw some pictures of it and your concept of, and I recommend to our listeners to go check out the Applied EV.com because I got some pictures of Blanc Robot up there, and it is paradigm shifting when you see something and it doesn't have a cabin, it really anchors it then, and I'm sure that was a good conversation piece. Also announced at CES with NXP's collaboration with Applied EV. So it looks like we'll be working together on development of software-defined vehicles' electronic architecture to drive forward innovation, create a safer, more connected autonomous electric mobility solutions. What does NXP's collaboration mean for Applied EV? Where are we working together?

Julian Broadbent (33:49):



As we described, there's a huge number of partners to solve what I think is probably the last implementation of software into an industry to redefine that whole industry. I think it's been done in every other industry. So Applied EV is never going to say that we do everything. We actually do a very small piece in some ways, an important piece we hope. And so in that value chain, you've got vehicles, we've talked about that. You've got all the suppliers and we've talked about the customers. We talked about autonomous companies. One of the other things that's important in that is the semiconductors that we use on our electronics inside the digital backbone.

(34:28):

We needed to find the world's best semiconductor company that had the highest safety rated semiconductor, one that was very specifically designed for vehicles that could help us unlock this amazing opportunity. In the value chain there are many players, and Applied EV does not try to do everything by any stretch. In fact, we rely on all of those partners to create this amazing solution. When a company like Applied EV spends nearly a hundred percent of its engineering energy, developing a control system for a car, the way that we choose a partner for the semiconductors is really important. We look at safety, we look at the reliability, the ability to work with a company over many generations of evolving a particular semiconductor.

(35:17):

And we looked at many and we ended up settling on NXP, but we don't look at our semiconductor sort of partner as a supplier relationship. We actually have to work with that partner to even evolve their own semiconductors. So part of the relationship that we've formed with NXP is they're curious about what the roadmap might look like for their own products. We obviously are finding things that we would like to suggest or recommend of how to improve that semiconductor for a world that no one has yet gone to. So it's a team effort to work out what the ultimate software-defined vehicle will look like.

Kyle Fox (35:56):

Oh, that's exciting. But truly we don't know what this thing's going to look like 20 years from now. And that's the exciting part, right? It's the unknown that you're heading toward that really gets you going. We always ask our guests the same question, and I'm really excited to hear your answer, and you've touched on a lot of this already, but the question is simple. I would like to understand how do you personally envision a greener world 50 years from now?

Julian Broadbent (36:20):

The greener world will be because we worked out a way for it to make sense, not to make sense on all of the values that decarbonization comes and how this is very important to the



world. You don't have to be a scientist this day to understand the science for everyone in the world. Every business in the world has a day-to-day challenge. So it's very hard for any business to think beyond the day-to-day. They try to, and if they've got capacity, they will. But most businesses around the world are really making a few percent profit. Of course, you've got some businesses that are having their heyday and then they come down again. But the bottom line is the old saying, if you made 10% a year every year guaranteed, you double your money in seven years. But that doesn't happen. The average of the world is less than 10% profit.

(37:15):

So to have the additional costs of going green is a barrier to green. I think the way to unlock green is to make it good for business, not just with government incentives, which obviously one way of addressing it, but how to create real purpose and having green technology is the go-to rather than the altruistic I think I should. How to do that, and I think software is going to play a very large part in that. As I said before, I think most green technology involves electrification of some sort. And electrification is great for software. Software loves electronics. Looking at any business and transitioning it to software, you'll ultimately end up finding yourself preferring electrification,

Kyle Fox (38:00):

Absolutely brilliant. It's unlocking green, it's not about because we should, it's because it's something that actually is needed. It's a benefit to the business line. And you described it perfectly. We've been talking about green, and that's part of this podcast itself is to try to promote those people that are looking to do that. What an amazing discussion, and I highly encourage our listeners to go check out CEO and founder of Applied EV, Julian Broadbent and his team. Go to [appliedev.com](http://appliedev.com). There's lots of material out there. You can go check out the CES videos from last year. They're doing incredible work. And after talking to Julian, now I understand why you get out of bed while your team is doing it. Thanks, Julian for joining us. Thanks for tuning in and we'll see you on the next one.