

**We are celebrating 70 years of *MotorTrend* this year. And our editorial team decided of all the Cars of the Year we've awarded—**

Elon Musk: We came second?

**No, you didn't come second.**

EM: Ultimate Car the Second.

**We wouldn't be here if that was the case. We're here to celebrate the Model S as our Ultimate Car of the Year, so congratulations.**

EM: Thank you. Great honor. We have massive respect for *MotorTrend*, and you guys have great judgment, obviously I think that, but best car publication I think.

**We appreciate that, and we also appreciate you guys bringing out a couple of your vehicles, including the original concept Model S.**

Franz von Holzhausen: Yeah, we started planning it in 2008 and just revealed it March of 2009. So early 2009 and actually, right behind that wall, right in this room is ...

EM: Yeah, that corner of the rocket factory, that big building, that's the main SpaceX production facility, and the Falcon rockets are made right behind that wall. And we didn't have a design studio or anything, so we just made one in a tent in that corner of the factory right there.

**Amazing. So when was the last time you saw this concept in person?**

EM: Actually, several years. It's been ages. I can't believe it's been 10 years since we unveiled this. That's crazy.

FvH: 10 years brought back a lot of emotions seeing it.

EM: Yeah, absolutely.

**What does it bring back? When you see this, what comes through?**

EM: Heartache. We gave our heart to this car for sure. Everything, just like all in.

**Any particular feature you look at and you're like, "Man, I remember how we really sweated over the ... "?**

FvH: Door handles.

EM: Door handles for sure, the nose, every curve, every crease, angle—we went over every tiny piece all the time. And it's a hard thing to make a sedan look good. To make a sports car look good is relatively easy. It's sort of like a runway model. The proportions are all ... they're set up to look good. But sedan proportions are not set up to look good. Most sedans don't look good.

FvH: And the overall challenge was to make sure we could fit seven people in this car. When you think about a sedan that fits seven people, it fits like oil on water. It doesn't really mix.

EM: I was just trying to get my kids in the car. So I was like ... we needed to have a rear facing ... two seats to the rear so I could get my kids in the car. But also be like, who has a sedan that can seat seven and that has a trunk in the front? So to be able to seat seven people and still carry luggage is crazy. So we wanted a car that had just crazy specs, that sounded impossible, and a lot of people said it was impossible. I don't know if you remember Dan Neil, who I actually have a lot of respect for—he wrote an article saying we're all BS it's not going to happen, the Model S is a fraud or whatever. He's talked to everyone in the industry, and they've all said it's impossible, so if we're claiming it's possible, that's not true. And I called Dan and was like, "Dan, I'll bet you it is." So we had like a bet. And he said, "Fine, I'll bet you you're wrong." "OK, I'll bet I'm right." And he was a good sportsman, paid up on the bet.

**So back then, can you describe what were the nights like? What were the days like?**

FvH: Yes, it kind of felt like we jumped out of the airplane and then decided we need to figure out how to get a team of people to design the parachute. So we were trying to find the people and design and create the product all kind of mid-flight, which is somewhat perilous. We put everything into it.

EM: We definitely put everything into it, and I want to give a lot of credit also to the engineering team. Because you can design something that looks good but doesn't work. So it needs to look good and work well, and in order to have a lot of interior room in the car, we had to make the drive unit light and tight. So we put maximum amount of effort into just compressing the package for the motor, gearbox, and inverter, getting the pack in there, in the floor.

FvH: And that's something we talked about on a daily basis. How do we get one more millimeter outside of the pack, one more, one more. Just relentlessly driving down to—

EM: Yeah, particularly the height, we were just down to fractions of a millimeter. So everything's like point how many millimeters high in order to get everything ... 'cause you've got a battery pack there, then you've got a floor pan, and you've got seat rails, and you've

got carpet, and there's quite a strong protective base plate on the bottom. And that all adds up, and then we want to have still good headroom in the car. But if you make the car too tall, you lose the beauty. It starts looking weird if the sedan is too tall. The length to height matters enormously in the feeling of aesthetics.

**Well you nailed it. It really has one of the best sedan stances on the road. We were talking earlier, though, about the display you put in there. How did that come about? Where did that come from?**

EM: We wanted to have a nice, big screen that ... like a 17-inch screen is what you get on a big laptop, so I was like, let's just go to the laptop supply chain and get a 17-inch screen. The hardest thing was getting the touch to work. So we were really pushing the envelope. We were doing, at the time, the largest high-precision touch interface of anything, car or otherwise, so we had a lot of trouble with the components to get the touchscreen to work because nobody had done it of that size anywhere. It's just a screen you can reprogram, you can update, you can keep it fresh. So even if somebody has a car from 2012, they can get the latest interface; they get more features and functionality. So we're still improving the features and functionality of cars that were made seven years ago.

**So you had that idea that you could over the years update, you could add Easter eggs, you could add games even? This was an idea that you had way back when from the inception of adding this touchscreen?**

EM: The basic principle was it's a computer on wheels. So if you had a laptop on wheels you want to have a big screen, you want to have a touch interface, and you want to have over-the-air [updating] capability. Then that gives you a lot of freedom to keep improving the car with software. The over-the-air stuff, we started doing that even on Roadster. It's just kind of like being normal in that, what is normal for a consumer trying to buy this would be that you can get an over-the-air update. PCs have been doing over-the-air or connected software updates for 30 years or whatever. So if you are going to make a computer on wheels, then you should obviously be able to connect to the internet, you should be able to update it, it needs to have at least the computer capability of an advanced laptop, and then you've got your laptop on wheels.

FvH: And then it improves with age. Not many cars do that.

EM: I think it's something much more obvious. At least it's very obvious if you're like a technologist and just sort of—if you live in Silicon Valley, you definitely want a software-upgradable, always-connected [car]. Seems crazy not to.

**The original Model S came out in 2012 for the 2013 model year. How come nobody has surpassed Tesla in terms of range and performance? The Model S is still the quickest production sedan *MotorTrend* has ever tested.**

EM: Well I don't know. It's surprising to us. I thought the industry would have had cars that are competitive to the Model S well before now because as we were talking about—the Model S debuted in 2009, and even if people thought, "Well, that's an impossible car to build," which conventional wisdom said that the Model S was an impossible car to build, and there were many articles written to that effect. But once we started delivering them to customers and they were approved by the regulators and met all of the safety requirements, it's like the Model S has got the best safety rating that NHTSA had ever tested of any car. I really expected that there would be within maybe three years or something, we'd have something that was better than the original Model S. But I guess the car industry is just fairly slow to evolve, and it didn't take electric vehicles really seriously until 2015, maybe 2014 you could say.

But when we debuted the Model S in 2012, we were in production hell—seems we were in production hell a lot. But as you move through orders of magnitude of production rate, each factor of 10 is for sure gonna be hell if you're making giant step changes. You're going from the original Roadster—we went from 600 cars a year to an initial production rate of 20,000 a year with Model S, and Model S is a far more complicated car. And Lotus was building the non-powertrain portion of the car for us for Roadster, then we did final integration at that old [Ford](#) dealership in Menlo Park. But it was like a giant leap, so we had tremendous difficulties reaching volume production for the Model S. We just sort of barely got to a run rate of 20,000 a year by the end of 2012. But our 2012 year was financially terrible. Even 2013 was still pretty bad. I think we did over 20,000 cars in 2013, but financially it was still a rough year.

I would say probably for the car industry, it was probably 2014 at the earliest, maybe 2015 before they started taking market share. A lot of the senior execs at the other car companies still didn't believe it, and we're like, "Well, you could just drive it and see if it's real."

**Prior to driving it, a lot of the car magazines and business publications were pretty critical of Tesla, and then we saw the light during our Car of the Year testing. I think *MotorTrend* Car of the Year was the first major award you had received.**

EM: That made a big difference. Getting *MotorTrend* Car of the Year was amazing, and it really helped validate Tesla and electric vehicles. So, very appreciative of that.

And the business publications? I know a lot of them have changed their tune, but it seemed to lag a little bit from the car journalists—maybe because these guys are from New York, they don't drive.

It for sure made a difference, yeah, absolutely. I think there's a fundamental disconnect to the business publications and for a lot of people from New York that are in the financial sector. They're just out of touch, and they don't know it. Whereas if you're in Silicon Valley or you're in L.A. and you see Teslas everywhere and people are driving them and then you have lots of friends if you're in this neck of the woods who are driving a Tesla and love it, then it's obvious what the situation is. But if you're in Manhattan and just getting driven around in a limousine, you're maybe not in touch.

**So we're here now, in the era you've successfully launched a Model 3, you've shown off the SUV based on that [Model Y], we talked a little bit about the coming truck, but this Model S is still the fixture. You're still upgrading it. You're still updating it. A couple of days ago you added a new video game—Beach Buggy—and I understand the game Cuphead is coming. Where does this come from? Where did the Easter eggs idea come from?**

EM: The overall goal is, how do you make a car as fun as possible? And we're not developing these games or anything. It's just they're existing games, and we said, "Hey, we think it would be fun to put a bunch of games in the car," and if you're in the car for any reason, you can just play a game in the car. We only have like a couple of engineers on this. It's not like a massive investment. But if you're waiting for somebody while they're shopping or you're charging up or something, you can play a video game. And especially if you can make it interactive, like interactive video games between various Tesla cars could be cool. Like some sort of interactive scavenger hunt with augmented reality could be pretty fun. I think there are a lot of fun things you could do in a car.

EM: And the overarching goal is, what can we do to make you fall in love with this car? And I think the biggest thing about Tesla and the cars that we make is that this is not designed by a soulless corporation. There's not like some finance spreadsheet or something like that with some market analysis. There's none of that. Obviously we need to bring in more money than we spend, but at the end of the day we want to make a car that we love, that hits us in the heart, that makes you feel. And how many of these cars, they have no soul. They make all these cars that have no soul or no heart, and they wonder why nobody feels anything for them. Why should they?

**That's a very bold statement because I think a lot of people feel like EVs, because they lack some of the sounds, some of the noise, some of the more manual controls,**

**actually have less soul. Maybe that's nostalgia or is it something else? I mean you prior to Tesla, you owned one of the, some would say the best sports car—**

EM: The E-Type?

**The [McLaren](#).**

EM: Oh, the McLaren F1.

**How do you juxtapose that? That was the supercar of the day.**

EM: It was. Now the Model 3 performance can beat it. I do think that the McLaren F1 was an incredible design, and for a gasoline car it's amazing. It's a piece of art, that car, for sure. I mean, it's aesthetically stunning, using state-of-the-art carbon fiber technology; the architecture is brilliant for F1. But when you go to electric, it's just a fundamentally superior technology. You've got physics on your side. You've got Isaac Newton as your co-pilot; he's helpful. So the Performance Model S, the McLaren the F1 is 50 percent slower 0-60 than the Performance Model S. Fifty percent. That's insane. And it's a four-door sedan that can seat up to seven. So you could probably put seven people and full luggage and still beat a McLaren F1.

**We'll try and validate that.**

EM: Yeah, should work.  $A \text{ equals } F \text{ over } M$ . Yeah, F's big.

**What's the next—I don't want to say the next 70 because I already asked you that. And as we try to stay relevant in our space, how is Tesla going to keep being relevant, being the leader in EVs? What do you have to do? What do you guys have to do?**

EM: Well, I think we've got to scale up our production, get to making millions of cars per year. And keep improving the price of the car, offering version of the car that cost less so that people can afford them while still having a car that people love and is great in every way. That's sort of our challenge overall. But I feel like we're on a good path to that. We've got a really exciting product lineup, just when we're talking about Tesla specifically, and we can talk more about the future, but we've got the Tesla Semi, the new Roadster, later this year hopefully we'll be unveiling the Tesla pickup truck, and Model Y will be going into production. I think in general, though, from a societal benefits standpoint, we need to just improve the cost of an electric powertrain—the battery pack and powertrain overall—to make the car more affordable, and we need self-autonomy. Those are the two things at a very high level that matter the most. But doing it along the way with heart and soul.

I think the autonomy is really going to transform automotive. ... I mean since the major innovations in production that Henry Ford and others can up with, the next two massive

disruptions for cars are electrification and autonomy, and electrification and autonomy are happening at the same time very basically. So the future will be all electric, all autonomous. I don't mean some electric, some autonomous, I mean all electric, all autonomous. And in fact, I would really caution someone against buying a gasoline or diesel car or truck because it will have poor resale value in the future.

It will be like—I've made this comment before—but it will be like, let's say it is 100 years ago, 1919, and a lot of people were still buying horses, and there was like this new radical thing called cars. Essentially you have this Model T or whatever, and people are like, "That's weird automobile technology that will never catch on," and they bought a horse, so that was a mistake. So trust me when I say the future is electric autonomy. So you want to buy a car that is electric, and you want to buy a car that is capable of autonomy, which a Tesla is. This will, I think, become very obvious within a few years.

It will change things quite a lot. If things were autonomous and cars are in use a lot, the fundamental utility of a car is right now is maybe 10 or 12 hours a week. Let's estimate an hour and a half, two hours a day. With a shared autonomous fleet, that goes up to like 50 or 60 hours on average, maybe more. So then the cars will be used a lot more. You'll want probably dynamic personalization, so it's like you step into the car, it knows who you are, it knows everything you want, and the car reconfigures itself automatically to all your preferences. So you could step into any car, and that's how it would be. There won't be a steering wheel in most cars, no pedals. I mean there will still be a small number of cars made for people who still want to drive cars, but it will literally become like horses. People have horses, but it's just not that many people who have horses, and they don't usually go to work with them. They're recreational. So it will be recreational, and cars that you drive manually or by yourself will be 1 percent of all cars, maybe 2.

Whether you like it or not, this is what's going to happen. But certainly for those that love driving, I don't think they will be prevented from driving, just like those who want to ride a horse, they are not prevented from riding a horse. But it will just be very few people that choose to do that.

FvH: I also think Model S proved that an electric vehicle can be beautiful and fun to drive and something you desire to own. And I think Tesla will do that with autonomy, as well. So it's not going to be a scary, ugly, dystopian future. It's going to be a fun, beautiful experience. And I think all of our products will have that. And this showed that's possible.