

Hollar: Welcome, ladies and gentlemen, to the Computer History Museum. I'm John Hollar, the CEO, and it's my pleasure to welcome you tonight on behalf of our trustees, our staff, our members, our amazing volunteers, all the people involved in making the museum a great place. Thank you. Thank you for being here tonight for the kick-off of our Revolutionary Speaker Series for 2013. We have major funding for the Revolutionary Speaker Series from Intel. We're delighted to have Intel's support for the fourth year running now, and it's fantastic, because it enables everything that we do to make these Revolutionary programs possible. We also get additional funding from the William K. Bose Foundation. I want to say a special thank you to Tesla for arranging to have a Model S here this evening. I hope you had a chance to see the Model S downstairs. We've been looking forward for years to an event when we could have the Motor Trend Car of the Year at the Museum <laughter>, and we have it here tonight, so thank you to Tesla. We asked SpaceX for a rocket <laughter>, that proved to be a little bit more challenging, but maybe someday. And now for tonight's program. Here's a thought exercise, if you compiled a list of the 75 most influential people of the 20th Century, who would be on your list? Or if you compiled, perhaps, a list of a hundred people who most affected the world in the 20th Century, who would be on that list? Now think of the same list that you might start compiling for the 21st Century so far. And if all of that proves to be a little too much, I can offer some help. Elon Musk has been on every single one of those lists that has been compiled for the 20th Century to date, no matter who seems to be drawing the lists up. Few scientists, entrepreneurs or industrialists of the last century could stake a claim to a career as boldly ambitious as the one Elon Musk is fashioning now. Transforming a large measure of the world's commerce and payment systems as Cofound and Chairman of PayPal in 1999, might be enough for anyone for one lifetime. But Elon Musk has gone on from there to pursue his passion for solving business, environmental and scientific problems on a global scale. He may be best known for his work at Tesla, where he serves as CEO and Head of Product Design. The path-breaking Tesla Roadster, and now the Model S have changed almost all of the assumptions that the automotive world has made about what the styling, performance and future of a new generation of electric cars might be. Simultaneously, he serves as Chairman and principle shareholder of SolarCity, the nation's leading provider of solar power systems. But perhaps his most ambitious and intriguing work is taking place at SpaceX, where he is CEO and Chief Designer. SpaceX is erasing the boundaries between space flight and private enterprise. It has a multi-billion dollar, multi-year agreement with NASA to be a workhorse for cargo flights to and from the International Space Station. And in 2015 that is the company's stated goal it will begin manned space flight. What is the source of Elon Musk's revolutionary thinking? How has he been able to do what he's done with the investors he's attracted and the teams that he's built? Exploring these questions and more tonight with Elon is Alison van Diggelen, who is a very notable and noteworthy journalist here in Silicon Valley, a contributor to KQED and the *Huffington Post*. And one of the best interviewers in the field through her series "Fresh Dialogues." We're delighted to have Alison here tonight. This is her first time onstage. She's going to be terrific, as will Elon. Please join me in welcoming Elon Musk and Alison van Diggelen.

<applause>

An evening with Elon Musk; January 22, 2013

Diggelen: So I'd like to start, you grew up in South Africa.

Musk: Right.

Diggelen: And I heard a wonderful story of when you were six-years-old, and you started breaking the rules even then. So you were six-years-old, and you were invited by your cousin to a birthday party, but there was only-- there were two problems with that. One, you were grounded. And two, it was on the other side of town

Musk: Yeah.

Diggelen: So can you explain-- tell the audience how you got there.

Musk: All right, this was when I was six, so the memory's a little fuzzy at this point, but as I recall, yeah, I was grounded for some reason-- I don't know why-- but I think I felt that it was unjust. <laughs> And I really wanted to go to my cousin's party, who was five. So it was a kid's party. So at first I was going to take my bike. But then-- and I told my mom this, which was a mistake. And she told me some story about how you needed a license for a bike, and the police would stop me. So I wasn't 100 percent sure if she was-- if that was true or not. But I thought I'd better walk, just in case. So yeah, I sort of thought I knew the way, but it was clear across town. So I don't know, it was ten or twelve miles away. It was really quite far, further than I realized, actually. And so I just started walking to my cousin's house. I think it took me about four hours. And just as my mom was leaving that party with my brother and sister, she saw me walking down the road, and freaked out. And then I saw she saw me, so I then sprinted to my cousin's house, and I was just about two blocks away, and then climbed a tree and refused to come down. <laughs>

Diggelen: Aw, so the first of many rule-breaking adventures for Elon Musk.

Musk: I guess, yeah.

Diggelen: So by the time you were twelve, you were already an entrepreneur and making a profit.

Musk: Well, a very small one.

Diggelen: I understand you earned \$500 equivalent in rand for creating a video game. Can you tell us about that, and what the inspiration was?

An evening with Elon Musk; January 22, 2013

Musk: Yeah, sure. So when I was about ten, I walked into a computer store in South Africa and saw an actual computer. I previously had some early sort of precursors to the Atari system, and then I got the Atari system, which I'm sure a lot of people here have played. And but then I started actually having computer way to make our games. And it was a Commodore Vic 20. So it was the first computer I bought. And I got some books on how to teach yourself programming. And this was like the coolest thing I'd ever seen. So I was just like this was super awesome. So I started programming games, and then selling games in order to actually buy more games. So it was a sort of circular thing. So more games and better computers and that kind of thing.

Diggelen: Right, so the money wasn't the end goal for you, it was more a means to an end?

Musk: Yeah, and basically I'd spend money on, yeah, better computers, and Dungeons and Dragons modules and things like that. <laughs> You know, Nerd Master 3000, basically. Yeah.

Diggelen: So I understand at that time, you were heavily into comics. I'm curious to know--

Musk: Yeah.

Diggelen: Did you love Ironman. The comic Ironman?

Musk: I did kind of like Ironman, yeah.

Diggelen: You did? Did you ever imagine that you would be the inspiration for the movie version?

Musk: I did not. That was pretty much say zero perc-- I would have zero percent chance. <laughs>

Diggelen: What kind of kid were you? I mean, can you look back and see yourself? Were you a bit of a loner kid? A bookish kid?

Musk: I certainly-- I wasn't all that much of a loner. At least not willingly. <laughter> So but I certainly was quite-- I was very, very bookish. I was reading all the time. So I was either reading, working on my computer, reading comics, playing Dungeon and Dragons, that kind of thing.

Diggelen: I understand "Hitchhiker's Guide to the Galaxy," a wonderful book by Douglas Adams, that was a key book for you. What was it about that book that fired your imagination?

An evening with Elon Musk; January 22, 2013

Musk: Yeah, I guess when I was around 12 or 13, I kind of had an existential crisis, and I was reading various books on-- trying to figure out the meaning of life. And well, what does it all mean, 'cause it sort of seemed quite meaningless. And then my-- we happened to have like some books by Nietzsche and Schopenhauer in the house, which you should not read at age 14. It's bad. <laughs> Just really negative. <laughs> So but then I read, "The Hitchhiker's Guide to the Galaxy," which was like quite positive, I think, and it sort of highlighted an important point, which is a lot of times the question is harder than the answer. And if you can properly phrase the question, then the answer is the easy part.

Diggelen: I see.

Musk: And so to the degree that we can better understand the universe, then we better know what questions to ask. Then whatever the question is that most approximates, "What's the meaning of life?" <laughs>, you know, that's the question we could ultimately get closer to understanding. And so I thought, "Well, to the degree that we can expand the scope and scale of consciousness and get-- and knowledge, human knowledge, then that would be a good thing."

Diggelen: Wow, so you were having these deep thoughts at what age? Ten, fourteen?

Musk: Yeah, sort of in puberty, I guess. So 13 through 15, probably the most traumatic years.

Diggelen: Right. And so by the time you were 17, you were ready-- you actually left, right? I assume you hatched the plan earlier when you were around 14/15?

Musk: I did hatch the plan earlier. Actually, I tried to hatch several plans, which they did not hatch. <laughs>

Diggelen: Right. But by 17, you were on a plane from South Africa. You'd had enough of South Africa. You were ready to seek new pastures. Now why was it the United States was your destination? Why not Europe or somewhere else in the world? Well, just whenever I'd read about cool technology, it would tend to be in the United States, you know? Or more broadly, North America, including Canada. So I kind of wanted to be where the cutting edge of technology was. And of course, within the United States, Silicon Valley is where the heart of things is. So although at the time I didn't know where Silicon Valley was. It sounded like some mythical place. <laughs>

Diggelen: Really? That's good.

An evening with Elon Musk; January 22, 2013

Musk: So yes, I wanted to come to the US. I tried to convince my mother or father-- who were divorced-- if either one of them would move to the United States, then I could get there. At one point, I convinced my father, but then he reneged, fortunately.

Diggelen: So you had him convinced, and then he changed his mind?

Musk: He did say, "Yes," and then he changed his mind.

Diggelen: Why?

Musk: I don't know. He was fairly established. He's an engineer, sort of established in South Africa and didn't want to have to go through that again in another country.

Diggelen: Right. So you got on that plane all by yourself at 17?

Musk: Yeah, so I actually got-- my mother was born in Canada, and actually her father was American. But unfortunately, she didn't get her American citizenship, so then that broke the link, and I couldn't get my American citizenship. But she was born in Canada, so I could get-- I actually filled out the forms for her, and got her a Canadian passport, and me, too. And then as soon as-- within three weeks of my getting my Canadian passport, I was in Canada.

Diggelen: Right. And then you ended up at University of Pennsylvania.

Musk: Yeah, I was in--

Diggelen: A degree in Physics and Business?

Musk: Yeah. So I was in Canada for a few years at Queens University. Got a scholarship to go down to University of Pennsylvania. 'Cause one of the downsides of coming to University in North America was that my parents said they would not pay for college if it was-- well, my father said he would not pay for college unless it was in South Africa. So it was either-- so I could have free college in South Africa, or find some way to pay it here. And fortunately, I got a scholarship at UPenn. And so I did a Business-- an undergraduate in Business, and Physics at UPenn.

Diggelen: And it was there that you came up with this idea of three main areas that you felt were most important to humanity. Can you describe how you came upon them. Was it just one day you had a flash

An evening with Elon Musk; January 22, 2013

of inspiration? "These are the three areas that are important and I want to concentrate on," or how did that inspiration come to you?

Musk: No, I think I was thinking about it before a couple years, during sort of freshman and sophomore year at Queens, and then also at UPenn. And I was trying to think what would most influence the future, you know, what were the problems that we have to solve? And I actually talked a lot to friends and my housemates and that kind of thing. And dates, which was maybe not the best thing. <laughter> So, yeah. I actually met a woman I dated briefly in college, who now works at *Scientific American* as a writer, and she related the anecdote that we went on a date. All I was talking about was electric cars. That was not a winning conversation. <laughter>

Diggelen: So it was a bit of a monologue, was it?

Musk: Yeah, she said the first question I asked her was, "Do you ever think about electric cars?" <laughter> She said she never does.

Diggelen: So you learned from that. That wasn't the best chat-up line.

Musk: Wasn't great. But recently, it's been more effective. <laughter>

Diggelen: There ya go. I bet it has! That's wonderful. Well, we'll get on to Tesla soon. But I want to go from University of Pennsylvania, you ended up in Silicon Valley. And you've described Silicon Valley as "Darwinian." Can you talk about what it was--

Musk: In the most positive sense, really. <laughter>

Diggelen: In the most positive. Can you elaborate on what that means, and why it had to be Silicon Valley. What drew you to Silicon Valley?

Musk: Well, I was at Penn, and there was a professor who was chairman of a company in Silicon Valley that was working on advanced capacitors, for use in electric cars-- potentially for use in electric cars. As it turns out, they're way too expensive. But I thought, "Well, this is really awesome." Because I asked if I could get a summer job, 'cause it was in Silicon Valley, and working on technology for electric cars. I thought, "Well, that's pretty much as good as it gets." So I got a summer job out here. It was in Los Gatos, actually at Pinnacle Research doing electrolytic ultra-capacitors, which were-- had a-- the problem was that they used ruthenium tantalum oxide. And there was, I think, only a few tons of ruthenium mined in the world. So not very scalable. And they'd sell it to you by the sort of milligram. So, you know, that was a

An evening with Elon Musk; January 22, 2013

problem. But it had a pretty high energy density. It sort of roughly equivalent to a _____ battery, which for a capacitor is huge.

Diggelen: Well, you ended up then after that at Stanford?

Musk: Yeah, so then I thought, "Well, Stanford is in Silicon Valley. It's sort of epicenter," and so that's where I wanted to come. Either Stanford or Berkeley, and Stanford is sort of sunnier. So I liked it.

Diggelen: Sunnier? That's good. And I understand you were at Stanford University for a whole two days before you decided, "No, it's time. I'm going to do my first startup."

Musk: Yeah, I figured, "Well--," so this is the Summer of '95, and I'd been working on some internet software. So actually, the three things that I thought would affect the world were internet, sustainable energy and space exploration, making life multi-planetary. So but on the internet thing, I just couldn't figure out how to make enough money to feed myself. You know? Because like, if the internet, if I couldn't make money, then I would run out of food and die. Because that was not good.

Diggelen: Basic needs, right?

Musk: Yeah, literally. So whereas, you know, if I was a student, then I could be a teaching assistant, and could do various things, and do research on electric vehicle technologies. That was my default plan. But then also that if I did a PhD at Stanford, then I would spend several years watching the internet go through this incredibly rapid growth phase, and that would be really difficult to handle. It's like you really want to be doing something.

Diggelen: So you saw the wave growing.

Musk: Yeah, so it really seemed like things were going to take off. Although, nobody had made any money in the internet at the time. In '95, there was really nobody was making any money in the internet. And in fact, even on Sand Hill Road, people were like, "What's the internet?" They were amazingly, when we'd try to get funding for a company, and I think it was November or something of '95, October/November, more than half of the venture capitalists we met with did not know what the internet was, and had not used it.

Diggelen: That's amazing.

An evening with Elon Musk; January 22, 2013

Musk: Yeah, literally. I mean, like just like-- they'd literally ask, "Isn't that something of the government and universities use?" I'm like, "Uh..., for now." <laughs> You know? I mean, yeah. But then Netscape went public in late '95, I think it was. And then after that, even though a lot of venture capitalists still didn't understand it, and still hadn't used it, they-- somebody had made money on it, so now--

Diggelen: It was on their radar.

Musk: Yeah, so when we went to get funding, the second time we tried to get funding, everyone was interested.

Diggelen: Right, so this company was Zip2.

Musk: That's right.

Diggelen: And--

Musk: Terrible name. <laughs>

Diggelen: What was the reason for that name?

Musk: Well, we were just incredibly stupid at the time. <laughter> That's the main reason for that name. And 'cause we got some ad agency, 'cause we thought, "Well, we don't know anything about names. So we'll get some ad agency to suggest a bunch of options." And then Zip2 seemed kind of speedy. I don't know what the hell-- why the hell we chose that stupid name. And it has a digit in it. It's like, why would you pick it? Because it could be Zip "t-o." It could be Zip "t-w-o." It could be Zip "t-o-o." So like, we literally spelled the name every variation. Which is bad if you got a URL, and you don't have the other ones. So Zip2 is not at all as basically like, say, we were trying to figure out how to make enough money to exist as a company. And so since there wasn't really any advertising money being made, we thought we could help existing companies get online, bring their stuff online. So we developed the software that helped bring a lot of the newspapers and media companies online. Because a lot of them just didn't-- they also didn't know what the internet was.

Diggelen: You had some big customers, didn't you?

Musk: Yeah. And even the ones that were aware of the internet, didn't have a software team, so they weren't very good at developing functionality. And so we had, as investors and customers, The New York Times Company, Knight Ridder, Hearst. And so we were able to get them to pay us to develop software

An evening with Elon Musk; January 22, 2013

for them to bring them online, so online publishing stuff. And we did maps and directions and yellow pages and white pages, and various other things. And we developed quite sophisticated technology actually. But it wasn't actually being employed super well by the media companies. We would suggest ways to use it, and then it would not be used as effectively as it could be. It was very frustrating.

Diggelen: Right. But you did sell the company successfully to Compaq.

Musk: Yeah.

Diggelen: Right? And that allowed you to go on and create X.com.

Musk: That's right. Yeah, exactly. So the-- yeah, Compaq had AltaVista. So their thought was combine AltaVista and a bunch of other technology companies, and see if that would work-- which it did not. But nonetheless, they were pretty nice guys, and bought the company. And that gave me the capital to do another company. I wanted to do another company in the internet, because I thought we hadn't really reached the potential that we could have with Zip2. Because I thought we had really sophisticated software. I mean, our software was sort of at least comparable to what Yahoo! Or Excite or other had. In fact, I thought in some ways it was better. So, but because it was all filtered through these partners, it wasn't getting properly used. So I thought, "Well, I want to do something that can be a more significant contribution to the internet." And so the initial thought was financial services, because money is digital. It's low bandwidth. At the time, there was-- you know, most people were on modems, _____ modems, because this was late '98, early '99.

Diggelen: So X.com was a precursor to PayPal, basically.

Musk: That's right, yeah.

Diggelen: Like why you merged with Confinity, and it became PayPal, major success!

Musk: Yeah, it sort of worked out better than we expected. <laughter> Yeah. So yeah, Confinity, so initially, Confinity and X.com started out from slightly different directions, and it converged to the same point. With X, the thought was to create an integrated set of financial services, so that you could go one place and do all of your financial anything. And then as a feature, we had the ability to transfer money, or securities or anything, simply by entering a unique identifier. So like an email address or phone number or something like that. And but when we were demoing the system, the hard stuff, which was the integration of all the financial services, people would not be interested in. But they'd be real interested in being able to transfer money using an email address. You know, that was actually quite easy. And so we focused our energy on that. And although, it's easy in principle, what gets really hard is adding security,

An evening with Elon Musk; January 22, 2013

while also keeping it easy to use. So 'cause it's like the Willy Loman quote, like, "Why do you rob banks?" "Because that's where the money is." So why do people rob PayPal? Same reason. And so you can dial up the security to a really high level, but then you're going to make it very hard to use. And so that was one of the toughest things we wrestled with. And then Confinity originally started as kind of software for Palm Pilots. And then they had a demonstration application with stability to beam money from one Palm Pilot to another using the infrared port. Yeah. People remember that one.

Diggelen: Yes.

Musk: That was big at one point. And then they had a website sort of parallel to that where you-- because once you beamed the infrared tokens, you had to sort of then synchronize your Palm Pilot and do the transfer via the website. But then people weren't that interested in the Palm Pilot stuff, but they were interested in the website. So we kind of converged at the same point, and we were quite close together, so we decided to merge the companies in I think January or so, 2000. A very turbulent period. And the growth in the company was pretty crazy. Like we had-- at the end of the first sort of four or five weeks, we had 100,000 customers.

Diggelen: That's incredible! Incredible growth. Did you anticipate that when you started out?

Musk: We definitely did not. <laughter> And it wasn't all good. Because we had some bugs in the software, and you know, even if the bug only occurs one in a thousand times, it's still-- that--

Diggelen: Right, if you have a big number like that.

Musk: You have 100,000 customers, you have 100 very angry customers. Like, "Where's my money?" That would be-- yeah. A reasonable-- considering what happened. And then we had customer service on University Avenue in Palo Alto. There were five people. <laughter> So when something went wrong, customer service phones would basically explode.

Diggelen: Oh, my goodness.

Musk: And so we had many challenges. And then the financial regulatory agencies were trying to shut us down. Visa and MasterCard were trying to shut us down. eBay was trying to shut us down. The FTC was trying to shut us down. There were a lot of battles there.

Diggelen: Wow. It is quite incredible with all that adversity, you conquered. And you came out with 100 million, right?

An evening with Elon Musk; January 22, 2013

Musk: Yeah, it was a close call. We definitely, I mean, came very close to dying in 2000 and 2001.

Diggelen: And what was the reason for that success? What would you put it down to in that case? How did you overcome?

Musk: Well, you know, I think we had a really talented group of people at PayPal. And a lot of those people have actually gone on to start many other companies.

Diggelen: Yes.

Musk: YouTube, LinkedIn, Yelp, Yammer. It's like quite a long list actually.

Diggelen: So for you, personally, there you were with several hundred million. Were you not tempted just to go on buy an island? <laughter>

Musk: Ha-ha. Not really.

Diggelen: What was it that drove you? What I'm getting at, because I know you didn't.

Musk: Sure.

Diggelen: What I'm getting at is why were you so driven to jump into the next thing?

Musk: Well, I was--

Diggelen: Did you take any time off?

Musk: I did take a bit of time off, because after PayPal, I did reasonably well from PayPal. I was <inaudible> show around the company. So and we were acquired for, I think, about a billion-and-a-half in stock, and then the stock doubled. So you know, it did reasonably well. But the idea of like lying on a beach as my main thing, just sounds like the worst-- that sounds horrible to me.

Diggelen: Just the boredom factor.

An evening with Elon Musk; January 22, 2013

Musk: I would go bonkers. I would have-- you know? I would have to be on serious drugs. I mean. <laughter>

Diggelen: Or serious piña coladas.

Musk: Right, exactly. I mean, I'd be super-duper bored. So I mean, I like high-intensity. I mean, I like going to the beach for a short period of time, but not much longer than like a few days or something like that.

Diggelen: Right. So let's talk about the seeds of SpaceX. I understand it started, not as the idea of, "Let's start a rocket-ship company." You had a philanthropic idea. You were really surprised when you found out that NASA didn't have any plans to go to Mars. And you came up with this idea of, "Let's put a greenhouse on Mars." So can you explain how that whole idea came into being for SpaceX?

Musk: Sure. Well, so when I was thinking of what I thought would affect the world as a student, it wasn't really from the standpoint of, "Those are the things I'll get involved in." It was kind of more in the abstract, "These are the things that I think will happen that will affect the world," but not, "That I will be involved in them." As it turns out, I have. But I always thought that we would make much more progress in space. And it just didn't happen. It was really disappointing. So yeah, I was really quite bothered by it. So you know, when we went to the moon, we were supposed to have a base on the moon. We were supposed to send people to Mars. And that stuff, it just didn't happen. We went backwards. You know, we got the Space Shuttle, but the Space Shuttle could only go to low-earth orbit; where a Saturn V could go to the moon. Now the Space Shuttle's gone. And so that just seemed like a really bad thing. So I thought, well, maybe it was a question of there not being enough attention or will to do this. This was a wrong assumption. So that's the reason for the greenhouse idea. The thought was, "If there can be sort of a small philanthropic mission to Mars," you know, I was expecting to lose all the money that I invested in that. But if we could send a small greenhouse up to Mars with seeds and dehydrated nutrient, and dehydrate it upon landing. And you'd have this great shot of a little greenhouse with little green plants on a red background. I thought that would get people excited.

Diggelen: So you literally imagined a photograph inspiring a new generation?

Musk: Yeah, you got to sort of imagine the money shot, if you will. <laughter> So yeah, I think green plants and red background would be that. And people tend to get interested and excited about precedents and superlatives. So this would be the furthest that life's ever traveled. The first life on Mars, as far as we know. And I thought, "Well, maybe that would result in a bigger nudge for NASA, and then we could sort of resume the journey." That was the basic idea. You know, I spent several months on this actually. And went to Russia three times. Because I was able to figure out how to get to the cost of the

An evening with Elon Musk; January 22, 2013

spacecraft low, and the communications, and the greenhouse and all that to a reasonable number-- reasonable meaning several million dollars.

Diggelen: Did you actually physically draw out a greenhouse of how you imagined?

Musk: Yeah, actually, I hope we've got that somewhere.

Diggelen: That'd be amazing to see.

Musk: Yeah.

Diggelen: Hm.

Musk: I mean, I'm sure it looks pretty goofy in retrospect. But that's the idea that we had and so I spent several hundred thousand dollars just kind of getting the design worked out, and engaging some companies to come up with design specifications for the sub-systems. And then it came to buying the rocket, and the problem was that the cost of rockets is really high. And the lowest cost rocket in the US at the time was the Delta II. Boeing's Delta II. And that would have been about 50 million dollars. Yeah. And then you'd still need to have like an upper-stage for Mars. So probably 60 million all-in. And that was-- and I wanted to do two of these missions, because if we did just one, and it didn't work, then that could have like a neg-- the opposite effect. Like, "Look how dumb it is to do-- to try to send things to Mars."

Diggelen: Right, "Look at all this money down the drain, right?"

Musk: So I wanted to do two. And I just didn't have enough money to do two complete missions.

Diggelen: Right. So you had a budget of about 100 million? Something like that.

Musk: Well, I was hoping it would be less than that. But not more than that. But then, I guess roughly on that order it was about most there be-- I mean, I couldn't spend much more than that. So--

Diggelen: So the Russians didn't help you out?

Musk: Yeah, three quite interesting trips to Russian to try to negotiate the purchase of two Russian ICBMs. <laughter> Yeah.

An evening with Elon Musk; January 22, 2013

Diggelen: And did they think you had evil intent?

Musk: No, they just thought I was crazy. But I mean, that's not good either, if you're buying ICBMs. But minus the nuke. I mean, I think that would have been a lot more. <laughter>

Diggelen: So you didn't talk nukes.

Musk: No, I mean, I didn't-- I slightly got the feeling that that was on the table if I-- <laughter>. Which was very alarming. But yeah, those were very weird meetings.

Diggelen: I bet.

Musk: With the Russian military and whatnot. I mean, I think they thought I was pretty crazy, but then they read about PayPal, and said, "Okay, he's crazy, but he's got money." <laughter>

Diggelen: "He did something right."

Musk: Yeah, well, and more importantly, I could pay them.

Diggelen: Right, yes.

Musk: So that's really-- I mean, they-- yeah, remarkably capitalist was my impression.

Diggelen: Of the Russians?

Musk: Yeah.

Diggelen: Right, I have heard that before.

Musk: Yep.

Diggelen: So tell me, what was the turning point from talking with the Russians and then deciding, "Okay, I'm going to do this. I'm going to set up the company." What was that turning point for you?

Musk: Well, I guess, I had-- I came to the conclusion that my initial premise was wrong. That in fact, there was a great deal of the "will"-- you know, there was not such a shortage. But people don't think there's a "way." And that if people thought there was a way, or at least something that wouldn't break the Federal budget, then people would support it. Which, in retrospect, I think is actually kind of obvious, because the United States is a distillation of the human spirit of exploration. People came here from other places. I mean, it's, you know, there's no nation that's more ancient explorers than the United States. But people need to believe that it's possible, and that it's not-- you know, they're not going to have to give up healthcare, or something important.

Diggelen: Right.

Musk: It's gotta be-- that's important. So I thought, "Okay, well, then it's not a question of will, it's a question of showing that there's a way. And I started reading quite a bit about rockets, to try to understand why they're so friggin' expensive. You know, it says something, you know, where does the 60 million dollars go for the Delta II, and then subsequently now Delta II, I think, is 100 million dollars or some crazy number. And Delta II is, I mean, that's a roughly small rocket. So if you go to like a really, you know, one of the bigger rockets, it's anywhere from 200 to 400 million dollars. Anyway, so I came to the conclusion that there wasn't really a good reason for rockets to be so expensive. And that they could be a lot less. And even in expendable format, they could be less. And that in-- if one could make them reusable, like airplanes, then the cost of rocketry would drop dramatically. The cost of space travel would drop dramatically. Because the cost of the fuel was maybe anywhere from .2 to .5 percent of the cost of the rocket.

Diggelen: Right.

Musk: You know, it's kind of like a plane. I mean, how much is the cost of the fuel of the plane, versus the plane itself? It's at least a two order of magnitude difference. But nobody had really been able to make a reasonable rocket work. So that-- but so I thought, "If we can do that, then that would really be the key breakthrough for space travel."

Diggelen: Right, but you also said that--

Musk: So far we have not succeeded, I just want to point out. <laughs>

Diggelen: You've also said that "Failure was the most likely outcome." Can you talk about failure in that sense, and in a broader sense, of being an entrepreneur and an innovator? Why is failure so important?

An evening with Elon Musk; January 22, 2013

Musk: Well, I mean, I think failure's bad. I don't think it's good. But if something's important enough then you do it even though the risk of failure is high. And so I think my advice, if somebody wants to start a company, is they should bear in mind that the most likely outcome is that it's not going to work. And they should reconcile themselves to that strong possibility. And they should only do it if they feel that they are really compelled to do it, you know. Because the way starting a company works is, like, usually in the beginning-- the very beginning, it's kind of fun. And then, it's really hellish for a number of years.

van Diggelen: Are you talking about chewing glass?

Musk: Yeah, a friend of mine who's a successful entrepreneur and started actually his career around the same time as I did, and he has a good phrase. His name's Bali [ph?]. He said, "Yeah, you know, starting a company is like eating glass and staring into the abyss."

van Diggelen: And you agree with that?

Musk: Generally true. Yeah. And if you don't eat the glass, you're not going to be successful.

van Diggelen: Yeah, tough medicine. So let's move along. We're going to get down into innovation and motivation shortly. But I want to just go through your whole business career first. So shortly after finding SpaceX, you then got interested in electric vehicles. And I understand you watched the vigils for the death of the EV1 when they were all smashed. Talk about that and why you felt, even after founding SpaceX, "I have to get involved with Tesla."

Musk: Yeah, well, like, my interest in electric vehicles goes back a long time to-- you know, it goes back 20 plus years...

van Diggelen: <inaudible>

Musk: Yeah, absolutely, exactly. And, in fact, the original reason I came to Silicon Valley was to work on electric vehicle energy storage technology. And I thought that the big car companies would develop electric cars because, obviously, the right move. And I thought that was vindicated when General Motors and Toyota announced their-- General Motors was doing the EV1, Electric Vehicle 1. Toyota did the electric RAV4, the original one. And they made those announcements and then, brought those to market. And I thought, "Okay. Well, this is great. You know, we're going to have electric cars. GM is going to, obviously, do the EV2 and 3. And, you know, they'll just keep getting better and everything will be cool. And then, when California relaxed its regulations on electric cars, GM recalled of the EV1's and crushed them into little cubes. You know, which seemed kind of nutty. So, in fact, the people didn't want their

An evening with Elon Musk; January 22, 2013

EV1's recalled. And in fact, they tried court orders to stop the cars from being recalled. They held a candle lit vigil, okay, at the yard where the cars were crushed. Now...

van Diggelen: Did you attend that vigil?

Musk: No. I did not. I did not...

van Diggelen: You were moved by it?

Musk: Well, certainly. I mean, it's crazy. I mean, when is the last time you heard about any company customers holding a candle lit vigil for the demise of that product? Particularly, a GM product.

<laughter>

Musk: I mean, what bigger wakeup call do you need? It's, like, "Hello. The customers are really upset about this."

van Diggelen: I bet they are.

Musk: They would really prefer it if it didn't get recalled. So that kind of blew my mind. So I was, like, "Wow." Okay. And then, we had the advent of lithium ion batteries, which helps the-- you know, that's one of the key things to make electric cars work. And _____ nothing. And so in 2003, I actually had lunch with one of the other cofounders of the company, JB Straubel, who was actually working, I think, on a hydrogen airplane or something. And he mentioned to me the Tzero car that was done by AC Propulsion. AC Propulsion, I think, it's sort of guys, some of whom had actually been on the EV1 program. And they took a gasoline sports car, kind of a kit car, and outfitted it with lithium ion batteries and sort of consumer grade cells. And they created a car, which was essentially the precursor of the Roadster. And in fact, it had very similar specifications. So it's a subzero-- a sub 4 second 0 to 60 miles an hour, 250 mile range, and also a two-seater sort of sports car. But it was quite primitive. It didn't have a roof, one thing, at all. And in fact, I don't know if it had doors. But it didn't have any safety systems, no airbags. It wasn't homologated. So you couldn't sell it. So in order to sell that car-- in order to create a commercial version of the car, something that _____ actually could produce and sell to people, there was a fair bit of work that was required. But anyway, I kept trying to get AC Propulsion to commercialize the Tzero. And I said, "Look. I'll fund the whole effort. You know, you really need to do this." And they just sort of refused to do it. They didn't want to do it. They wanted to make, like, what's that-- oh, they wanted to make, like, an electric Scion, which in principle, sounds good. Except that it would've cost \$75,000. And nobody wants to buy a 75,000-dollar Scion. And the technology just was not ready. There was just no way to make a good value for money proposition with something like a Scion.

An evening with Elon Musk; January 22, 2013

van Diggelen: What was it that compelled you to say, "I have to be CEO here and lead this company?" Why not say, you know, "I'll help you, JB, get this rolling?"

Musk: Well, I really didn't want to be CEO of two companies. I tried really hard not to be, actually. And anyway, so AC Propulsion finally said okay. I actually told AC Propulsion, "Look, if you're not going to do this, I'm going to create a company to do this." And they said, "Well, there are some other guys who are also interested in doing that. And you guys should combine efforts and create a company." And that's, basically, how Tesla came together. And then, we had a lot of drama. I mean, since, you know, I provided like 95 percent of the money, so I could've been the CEO from day one. But I really-- you know, the idea of being CEO of two startups at the same time was not appealing. And shouldn't be appealing, by the way, if anyone's thinking that's a good idea. It's really a terrible idea.

van Diggelen: But then, again, you know, going back to your trajectory here, not only did you take on two, you took on three. You had an epiphany at Burning Man, I understand, and decided, "No, I want..."

Musk: You have to watch those epiphanies at Burning Man. Not necessarily what you should pursue.

van Diggelen: And you came up with the idea...

Musk: Yeah, few have been there. You know, well, solar is kind of part of the whole sustainable energy thing. Sustainable energy, you have to have sustainable means of producing and consuming energy. And so, I mean, if you have electric cars, you have to have the other side of the equation, say, how do you produce energy in a sustainable way? And I think solar is the obvious primary means of sustainable energy generation. In fact, the earth is almost entirely solar powered today. The only reason we're not a frozen ice ball at, sort of, 3 degrees kelvin is because of the sun. And the sun is responsible for all precipitation. It's responsible for the vast majority of the ecosystem, apart from sort of chemotropism at the bottom of the ocean. So there's just a tiny amount of energy that people consume to power civilizations. Actually, a very tiny amount of energy, relative to the amount of energy that the sun sends in our general direction. And so in order to deal with that, we could, in fact, power the entire world with solar power quite easily. This is maybe not _____ people.

van Diggelen: So was that the epiphany you had at Burning Man? Was it a vision?

Musk: Oh, no. I knew that long ago. I knew that in college.

van Diggelen: But what was the key vision that came to you at Burning Man? We all want to imagine you there.

An evening with Elon Musk; January 22, 2013

Musk: Yeah, it was a vision. No. It was more-- I wouldn't say it was a particular epiphany. It was more that I was at Burning Man with my cousins, or to my cousins, Lyndon...

van Diggelen: Lyndon and Peter?

Musk: Lyndon and Peter Rive, who are awesome guys. And they were, sort of, trying to think what should they do after their first startup. So they had a company called Everdream, which did large scale management of computers. So if you've got, like, 60,000 computers, it's kind of hard to manage them. So they wrote this-- they created software that enables companies to do that. And that company actually got sold to Dell.

van Diggelen: So they were looking for a new venture?

Musk: Yeah.

van Diggelen: And looking for your ideas?

Musk: Well, I wouldn't say initially looking for my ideas. But I actually was trying to convince them that they should do solar. Because I just thought it was an area that needed people like them, who are really good entrepreneurs. And since I was, like, somewhat over committed, I thought...

van Diggelen: To say the least.

Musk: Yeah, I thought-- and I said, "All right. Look, if you guys will do a solar company, I'll provide all the funding and, you know, whatever guidance or help I can provide. I'd do that." And I thought it was really important that there be, you know, good entrepreneurs like them in solar because it just wasn't doing very well as an industry. And I thought people were kind of focusing on not the-- they weren't focusing on the right problem. Everybody sort of thought that the panel was the problem, but actually, it's a problem, but it's not the most important problem. And the panel is somewhat commoditized at this point. So making standard efficiency solar panels is about as hard as making drywall. It's really easy. In fact, I'd say drywall is probably harder. But what is a thorny problem is trying to figure out how to get solar on tens of thousands and eventually hundreds of thousands of rooftops.

van Diggelen: Right, the logistics part.

Musk: Yeah, it's kind of like you've got to reroof millions of buildings. And then, figure out how the grid interconnects work and then manage all those systems. So if you've got hundreds of thousands or maybe

An evening with Elon Musk; January 22, 2013

millions of systems eventually, you've got to manage all these distributed systems. You have this really complex distributed utility, effectively, which I think actually plays to their strengths in creating-- _____ in creating really scalable software for managing, you know, hundreds of thousands of computers in a distributed fashion. And that's kind of what they did. And did an awesome job. It was just, like, I basically would show up at the board meetings to hear, like, "What's the good news this time?" You know, it's like really-- you know, we had maybe a couple of bad news board meetings-- Well, late 2008 there was some bad news board meetings. But for the most part, far from a few times, when the macroeconomic conditions were really terrible, they just did an amazing job with, you know, almost no help from me.

van Diggelen: So you've been able to leave it in their good hands?

Musk: Yeah, they deserve the vast majority of the credit for the success of that company.

van Diggelen: Awesome. So I'd like to move on to innovation and motivation. There's been a lot of talk lately about the fact that innovation is leveling off. We're not making the dramatic increases or improvements in innovation, like we did when the plane was invented...

Musk: I don't know about that.

van Diggelen: Do you agree with that?

Musk: No. I don't agree with that. I don't think that's true. I think we've seen-- well, and I'm not sure of what time period that is exactly. But we've seen huge improvements in the Internet and new things. I mean, you know, in recent years, Twitter and Facebook being pretty huge, when people kind of thought the Internet was done. And, you know, I think that there are some of the things that we're doing, like, you know, electric cars are a new thing. And I do think there's some pretty significant breakthroughs. I mean, in genomics, we're getting better and better at decoding genomes and being able to write genetics. I think that's going to be a huge, huge area. I think there's likely to be some breakthroughs in artificial intelligence. And I suspect we will even see the flying car.

van Diggelen: All right. Is that going to be an Elon Musk production?

Musk: No.

<laughter>

An evening with Elon Musk; January 22, 2013

van Diggelen: You're going to let someone else do that?

Musk: Yeah. Well, I think someone else is doing that.

van Diggelen: All right. Okay. That's another conversation. Do you feel the government is standing in the way of innovation, at all?

Musk: Well, sometimes, the government-- I don't think the government intends to stand in the way of innovation. But sometimes, it can over regulate industries to the point where innovation becomes very difficult. I mean, the auto industry used to be a great hotbed of innovation at the beginning of the 20th Century. But now, there's so many regulations that are intended to protect consumers, I mean, the body of regulation for cars could like full-- you know, this room, it's just crazy how much regulation there is. And down to, like, what the head lamps are supposed to be like and they even specify some of the elements of the user interface on the dashboard. And some of these are completely anachronistic, because they're relating back to the days when you had, like, a little light that would illuminate an image. So, like, we have to reserve space on the instrument panel of the Model S for where all of the indicators that a car would have. You know, you've got, like, these little lights like...

van Diggelen: "Check Engine" or whatever?

Musk: Yeah, like all these little things. There's, like, a whole bunch of them. And we can't have anything else in that space. Like, "Well, how about if we have one space and render a different graphic?" Like, "Oh, no. Because people are expecting to see it in that space." And, like, "Nobody is expecting to see it in that space."

<laughter>

van Diggelen: Yeah, so you feel kind of argue with these regulations, you just have to _____...

Musk: Well, you can argue with them, but not with great success.

<laughter>

Musk: And you can actually get these things changed, but it takes ages. Like, one of the things we're trying to get is, like, why should you have side mirrors, if you can have, say, little video cameras, tiny video cameras and have them display an image inside the car? But there are all these regulations saying

An evening with Elon Musk; January 22, 2013

you have to have side mirrors. And I went and met with the Secretary of Transport, and like, "Can you change this regulation?" Still, nothing has happened. That was, like, two years ago.

van Diggelen: So you're banging your head against a wall here a little bit?

Musk: It's not easy to get these regulations changed.

van Diggelen: So talking of government, President Obama's obviously trying to do what he can. If you had five minutes with President Obama, what would you advise him for, one, stimulation the economy, and entrepreneurship and creating jobs? Is there one thing that if you could successfully get through, that would be a big stimulus, do you think?

Musk: Well, I think, actually, the reality of being President is that you're actually, like, the captain of a very huge ship and have a small rudder.

<laughter>

Musk: Because, obviously, I mean, if there was a button that a President could push that said, "economic prosperity," you'd be like, they're hitting that button real fast.

van Diggelen: Full steam ahead, yeah.

Musk: You could measure the speed of light by how fast they pressed that button. Because that's called, like, the "re-election" button. So I'm not sure how much the President can really do. But I think-- you know, I'm generally a fan of, like, minimal government interference in the economy. Like, the government should be kind of like the referee, but not the player. And there shouldn't be too many referees. But there is an exception, which is when there's an unpriced externality, such as the CO2 capacity of the oceans and atmosphere. So when you have an unpriced externality, then the normal market mechanisms do not work. And then, it's government's role to intervene in a way that's sensible. And the best way to intervene is to assign a proper price to whatever the common good is that's being consumed. And then...

van Diggelen: So you're saying there should be a tax on gas?

Musk: There should be a tax on carbon. You know, if the bad thing is carbon accumulation in the atmosphere, then there needs to be a tax on that. And then, you can get rid of all subsidies and all everything else. And it seems, like, logical that you should tax things that are most likely to be bad, rather

An evening with Elon Musk; January 22, 2013

than-- you know, like, that's why we tax cigarettes and alcohol. Because those are probably bad for you. Certainly, cigarettes are.

<laughter>

Musk: So you want to err on the side of taxing things that are probably bad and not tax things that are good. And so I think, given that there is a need to gather tax for the-- you know, to pay for the federal government, we should shift the tax burden to bad things. And then, adjust that tax or that bad thing according to whatever's going to result in the behavior that we think is beneficial for the future. I mean, I think, currently, you know, what we're doing right now, which is mining and burning trillions of tons of hydrocarbons that used to be buried very deep underground. And now, we're sticking them in the atmosphere and running this crazy chemical experiment on the atmosphere. And then you've got the oil and gas companies, which have ungodly amounts of money. And you can't expect them to just roll over and die. Like, they don't do that. So actually, what they would much prefer to do is spend enormous amounts of money lobbying and running focused ad campaigns and that kind of thing to preserve their situation. You know, it's a lot like tobacco companies in the old days. I mean, they used to run these ads with doctors, like a guy with a doctor-- you know, pretending he's a doctor. You know, essentially implying that smoking is good for you. And, like, having pregnant mothers on ads smoking. And...

van Diggelen: Do you have a message for the climate change skeptics and the big oil people?

Musk: Well, as far as climate change skeptic, I mean, you know, I believe in the scientific method. And one should have a healthy skepticism of things in general. And, you know, if you approach things from a scientific standpoint, you always look at things probabilistically, not definitively. And so I think a lot of times, if somebody's a skeptic in the science community, what they're really saying is that they're not sure that it's 100 percent certain that this is the case. But that's not the point. The point is to look at it from the other side to see what do you think the percentage chance is of this being catastrophic for some meaningful percentage of the earth's population? Is it greater than 1 percent? Is it even 1 percent? If it is even 1 percent, why are we running this experiment?

van Diggelen: Right. You called it a Russian roulette. We're playing Russian roulette with the atmosphere.

Musk: We're playing Russian roulette. And then, as each year goes by, we're loading more rounds in the chamber. It's not wise. And what makes it super insane is that we're going to run out of oil anyway. It's not like there's some infinite oil supply. We're going to run out of it. So we know we have to get to a sustainable means of transportation, no matter what. So why even run the experiment? It's the world's dumbest experiment.

An evening with Elon Musk; January 22, 2013

van Diggelen: Right. Yeah.

<applause>

van Diggelen: So let's move on to focus on Silicon Valley. Steve Jobs was and is a wonderful Silicon Valley icon. Is he someone that you've admired? And what have you learned from Steve's life and work?

Musk: Well, he's certainly someone I've admired. Although I did try to talk to him once at a party and he was super rude to me.

<laughter>

Musk: But I don't think it was me. I think it was, sort of, you know, par for the course.

van Diggelen: I think you weren't the first.

Musk: Yeah, not the first, no. And I was actually there with-- like, Larry Page is an old friend of mine. I've known Larry since before he got venture for Google. And Larry was the guy that introduced me to Steve Jobs. So it's not as though, like, I'm going and tugging on his coat, like, you know, "Please talk to me."

<laughter>

Musk: So I was introduced by Larry Page _____. But, I mean, obviously, he was an incredible guy and made fantastic products. You know, and I don't know, there was like a certain-- he had a certain magic about him, you know, just sort of that was really inspiring. So, I mean, I think that's really great.

van Diggelen: Is there that magic that you try and emulate?

Musk: No. I think Steve Jobs is way cooler than I am.

van Diggelen: Okay. So I'd like to get inside your head a little bit. You know, when you come up with an idea, do you doodle it, you know, on a pad of paper? Or do you get your iPad out and take notes? I mean, when you come up with something new, you know, a new rocket design or whatever it is, how does that manifest itself? Could we see you being creative?

An evening with Elon Musk; January 22, 2013

Musk: I mean, it's somewhat cliché, but it happens a lot in the shower. I don't know what it is about showers. Yeah, exactly, get the camera.

<laughter>

Musk: No. I do. I just kind of stand there in the shower.

van Diggelen: So you have long showers...

Musk: I do, actually.

van Diggelen: ...and you create _____...

Musk: Yeah, long showers. It sounds wrong. But yeah, I do.

van Diggelen: So there's no iPad...

Musk: And of course, not to mention...

van Diggelen: ...the shower; right?

Musk: ...the Burning Man epiphanies, those are huge. So yeah. And then, there are some times, like, late at night, if I've been thinking about something and I can't sleep and I'll be up for several hours, thinking about-- just sort of pacing around the house and thinking about things. And occasionally, I'll sketch something or send myself an email or something like that.

van Diggelen: Right. So I have a question from the audience. "Who inspires you, or do you have a mentor?"

Musk: Well, I don't have a mentor, per se. Although, I try to get feedback from as many people as possible. And so I have friends and I ask them, you know, what they think of this, that and the other thing. And, you know, as I mentioned, Larry Page is a good friend of mine. I value his advice a lot. And I have many other good friends. And so I think it's good to solicit feedback and particularly, negative feedback actually. Because, you know, obviously, people don't love the idea of giving you negative feedback, unless it's like some-- you know, on blogs, they do that.

An evening with Elon Musk; January 22, 2013

van Diggelen: Yeah, how do you deal with negative feedback? Because you got some tough criticism, especially with SpaceX. You had incumbents, like Neil Armstrong, even speaking out and saying...

Musk: Yeah, that was weird.

van Diggelen: ..."This is wrong. We don't want, you know, commercial companies in space. It's not a place for commerce." So how did you deal with that? And how do you deal with naysayers in general? Because you've had a lot.

Musk: Yeah, that was kind of troubling. Because, you know, growing up, Neil Armstrong was kind of a hero. So it, kind of, sucks to, you know...

van Diggelen: Knife in the back; right.

Musk: That's a bit of a blow. So yeah, but I think in his case, he was somewhat manipulated, you know, by other interests. So I don't think he quite knew what he was saying in those congressional hearings.

van Diggelen: Right. Okay. And talk about, you know, it's one thing to have these wonderful ideas in the shower or at Burning Man. But it's another thing to build, motivate and retain a team of excellent people. Can you talk about some tips and some things you've learned that obviously work for you?

Musk: Yeah, well, I mean, think about a company. A company is a group of people that are organized to create a product or service. That's what a company is. So in order to create such a thing, you have to convince others to join you in your effort. And so they have to be convinced that it's a sensible thing. That there's at least some reasonable chance of success. And if there is success, the reward will be commensurate with the effort involved. And, you know, so I think that getting people to believe in what you're doing and in you is important. So in the beginning, there will be few people who believe in you or in what you're doing. But then, over time, as you make progress, the evidence will build and more and more people will believe in what you're doing. So I think it's a good idea when creating a company to have a demonstration, or if it's a product, to have a good mockup. Or even if it's software, to have good demo ware or to be able to sketch something. So people can really envision what it's about. Try to get to that point as soon as possible. And then, iterate to make it as real as possible, as fast as possible. Yeah. I don't know if that makes sense. But...

van Diggelen: Okay. So you're CEO of two companies. You're Chairman of Solar City. Talk about time management. How on earth do you do this?

An evening with Elon Musk; January 22, 2013

Musk: Well...

van Diggelen: Do you get any sleep?

Musk: Sometimes not enough. Sleep is really great. Because I find if I don't get enough sleep then I'm quite grumpy. I mean, obviously, I think most people are that way. And also, like, I try to sort of figure what's the right amount of sleep. Because I found I could drop below a certain threshold of sleep, and although I'd be awake more hours and I could sustain it, I would get less done because my mental acuity would be affected. So I found generally the right number for me is around six to six and a half hours, on average, per night.

van Diggelen: That's not too bad.

Musk: Yeah.

van Diggelen: All right. And any other tips on...

Musk: That is an average, though.

van Diggelen: Right. Any other tips on just managing to run two companies simultaneously? I mean, do you find-- I mean, I know you're up here on Monday, Tuesday. Is it all Tesla when you're up in Silicon Valley and all SpaceX Wednesday, Thursday?

Musk: Having a smart phone is incredibly helpful. Because that means you can do email during intercessional periods, like if you're in a car or you're walking, in the bathroom, everywhere. You know, you can do email practically when you're awake. And so that's really helpful to have email for SpaceX and Tesla integrated on my phone. And then, it's just you have to apply a lot of hours to actually working. So the way I generally do it is I'll be working at SpaceX on Monday. And then, Monday night fly to Bay Area, spend Tuesday and Wednesday at the Bay Area at Tesla. And then, fly back on Wednesday night and spend Thursday and Friday at SpaceX. In the last several months, then I would fly back here on a Saturday. And either spend Saturday and Sunday at Tesla or spend Saturday at Tesla and Sunday at SpaceX.

van Diggelen: And where do the boys fit in? You have five sons.

Musk: Yeah, I kind of...

An evening with Elon Musk; January 22, 2013

van Diggelen: Do they tag along with Dad on some of these trips?

Musk: I do drag them along on a lot of things, actually. They're remarkably unimpressed by it.

<laughter>

Musk: Yeah, I wish they were sort of more interested. But, I mean, they're only-- the twins are eight and the triplets are six. So maybe they'll get more interested later. But...

van Diggelen: Do you see one day grooming one of them or several of them to take over your companies?

Musk: Well, I mean, I think if they're inclined to-- I mean, if they're really interested in working at Tesla or SpaceX then, you know, I'd help them do that. I'm not sure I'd want to necessarily try to insert them into the CEO role at some point. You know, it's kind of like if the rest of the team and the board kind of felt that they were the right person then, that would be fine. But I wouldn't want people to feel like I, kind of, you know, installed...

van Diggelen: <inaudible>

Musk: ...my kid there. And I don't think that would be good for either the companies or the kid, really. But I was actually, at one point, of the school of thought that, you know, it's best to give away kind of, like, 99 percent or more of ones assets. Kind of like the Buffett school of thought. And I'm still mostly of that-- inclined in that direction. But after seeing what happened with Ford and GM and Chrysler, where GM and Chrysler went bankrupt, but Ford did not. And Ford seemed to make better long-term choices than the other two companies. And that's in part because of the influence of the Ford family. And I thought, "Well, okay. There may be some merit in having some longer-term family ownership." At least, a portion of it, so it acts as a positive influence. I mean, this is still something I'm thinking about. But acting as a positive influence in the long term, so the company kind of does proper long-term things. And, you know, look at what happened also in Silicon Valley with HP. I mean, I think it's quite sad.

van Diggelen: Yeah, it is.

Musk: And that, to some degree, is because there was much diminished influence by the Hewlett and Packard families. So I think they should've prevailed in their-- you know, where they were opposed with the merger that took place, at one point. And I think they were right, actually.

An evening with Elon Musk; January 22, 2013

van Diggelen: Right. And looking to the future for SpaceX, is there an IPO planned for this year?

Musk: No, there's no IPO plan. I will say, running a public company does have its drawbacks.

van Diggelen: So you're not in a hurry?

Musk: No.

van Diggelen: Okay.

Musk: I mean, in the case of Tesla and SpaceX, we had to raise capital. And we had kind of a complex equity structure that needed to be resolved by going public. And so I thought we kind of needed to do that in those two cases. We don't have to do that at SpaceX. I think there's a good chance we will at some point in the future. But SpaceX's objectives are super long term. And the market is not. So I'm a bit worried that if we did go public, certainly going public too soon, that market pressure would force us to do short term things and abandon kind of long-term projects.

van Diggelen: Like going to Mars?

Musk: Right. Going to Mars is very long term.

van Diggelen: Yes. That's an important one. So you do have other projects on the back burner. You've talked about the Hyperloop, a way of getting people from downtown LA to downtown San Francisco in under half an hour. And the electric supersonic airplane.

Musk: Yeah.

van Diggelen: Which of those two are bubbling up that we might hear more about in the near future?

Musk: Well, I did promise that I'd do some paper on the Hyperloop idea. And things got a little hectic towards the end of last year, because I had committed to make these milestones at Tesla, to the public markets. And I had to stay true to that obligation, which required just an insane level of work and attention. And then, we also had the Solar City IPO, which was a very difficult IPO to get done. And that IPO occurred just by the skin of its teeth. I mean, it was such a tough one.

van Diggelen: Were you just determined it had to be in December?

An evening with Elon Musk; January 22, 2013

Musk: Well, if it wasn't in December, it would mean pushing it out, you know, quite a bit. And the problem is that we'd already pushed it out quite a bit. So if we didn't go public, we'd have to do a private round. And then, it just-- the whole thing wouldn't feel right. You know, it's like you're sitting at the-- it's like you're, you know, at the altar and you don't do the wedding. It's a bit awkward, you know.

van Diggelen: Right. To say the least.

Musk: Yeah. So we really needed to do it. And I think if we hadn't done it, people would've looked at it as a failure and it wouldn't have been good. Because there have just been too many failures in the solar-- or too many-- not enough success, I'd say, in the solar arena. There needed to be sort of-- we need to chalk up the success in the arena.

van Diggelen: Yeah, it was a rare piece of sunshine for the solar...

Musk: Right, exactly.

van Diggelen: ...industry last year, that's for sure.

Musk: But ironically for a solar industry, does not have a lot of that.

van Diggelen: So it's time, unfortunately, for the last question. You've come a long way since you were that six-year old little boy breaking the rules. You turned 42 this year?

Musk: Right.

van Diggelen: What is on the cards? Where do you see yourself in 10 years' time, 20 years' time, 40 years' time? Because you famously said you want to die on Mars, just not on impact.

Musk: Right.

<laughter>

van Diggelen: Tell us about that dream.

An evening with Elon Musk; January 22, 2013

Musk: Yeah, well, actually, I was asked by a journalist, "Do you want to die on Mars?" And I said, "Yes." But I was, like, "But wait, not on impact, just to be clear." Because that's one of the possibilities. So I guess, I mean, I'd like to be able to go to Mars while I'm still able to manage the journey reasonably well. So I think, I don't want to be, like, 75 and go to Mars.

van Diggelen: You don't want to take your Zimmer frame with you?

Musk: Right. You know, at least in the beginning, it could be, you know, mildly arduous. So I'd like to get there, I don't know, I mean, ideally in my 50's. That would be kind of cool.

van Diggelen: So you see that happening in the next...

Musk: Well, I mean, I aspire to make that happen. And I can see the potential for that happening. And I'm not saying it will happen. But I think it can happen. I'll try to make it happen.

van Diggelen: Great. Ladies and gentlemen, Elon Musk.

<applause>

END OF LECTURE