From Cars to the Stars

14 April 2008 Elon Musk

Former PayPal CEO Elon Musk talks to Barry Mansfield about his plans to bring the electric car to the mass market. Then there is the small matter of conquering space.

He is still only 35, but South African serial entrepreneur Elon Musk has already made steady progress toward the three modest goals he set for himself at university: to transform the internet, pioneer clean energy and propel mankind towards inter-planetary travel.

Musk arrived at Stanford University hoping to study for a PhD on batteries for electric cars, but dropped out to jump on the dotcom bandwagon. What followed has become a staple of Silicon Valley folklore. Musk netted an estimated $200m after selling one internet business, Zip2, to Compaq for $307m and then another that he co-founded, PayPal, to eBay in 2002 for $1.5bn.

Instead of retiring comfortably, Musk quickly moved to invest his profits in clean energy and space. His first project was Tesla Motors, an electric car company and the first new US car firm in decades.

In July 2006, Tesla unveiled its first model: a sports car called the Roadster, which is faster than a Ferrari, more environmentally friendly than a Toyota Prius and capable of travelling 250 miles on a single overnight charge from a normal household power socket. The waiting list for a Roadster was eagerly joined by celebrity fans, including California Governor Arnold Scharzenegger.

SPACE PROJECT

Musk is clearly addicted to launching companies, and the latest to take off is a space travel business. Back in 2002, he started SpaceX, or Space Exploration Technologies, to build a rocket that he hoped would cost only a third as much as current models.

He wants governments, universities and businesses that need an inexpensive way to get satellites into space to turn to this new company for help.

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In March last year, the Falcon, a two-stage rocket owned by Musk's firm, lifted off from the Marshall Islands in the western Pacific and reached an altitude of some 200 miles. The smooth lift-off and separation of the two stages went according to plan, greatly encouraging customers waiting for SpaceX to launch their satellites, which include an arm of the Pentagon and the Malaysian government. The Falcon can now lay claim to being the first rocket designed, developed and financed by the private sector that is anywhere close to transporting a payload into space. Musk designed much of the rocket himself.

He was inspired to create SpaceX by the lack of innovation there has been in space exploration compared with other industries. "In 1969 we were able to go to the moon," he says. "Here we are over three decades later, and we can barely get into a low orbit. By any measure, that is a step backwards."

SpaceX is not going into direct competition with Nasa. "There's a perception in the public mind that a company like SpaceX is competing with Nasa," says Musk. "In fact, Nasa is a customer of ours. We are providing launch services to Nasa. Starting in 2011, SpaceX's rocket will replace the shuttle in servicing the space station with astronauts and cargo."

In time he believes his rockets will cost a tenth of those of his rivals and carry much larger payloads. This is critical, because the really big money lies in launching heavy payloads.

However, Musk alleges that the industry has unfairly tried to lock him out. When the USAF recently awarded several launch deals to a consortium formed by Boeing and Lockheed Martin, the sector's dominant firms, SpaceX made its grievances known. It has sued the two aviation companies on the grounds that they have been colluding to keep low-cost competitors at bay, a charge both firms deny. Musk knows that breaking into the rocket business is going to be far from easy.

OUT OF AFRICA

Musk's audacious venture into such a competitive business fits his character well. He showed entrepreneurial leanings at a young age: at just 12 he taught himself to write computer code and designed a game called Blast Star. He says he sold the code to a media company for $500.

The young Musk felt isolated in South Africa, being so far away from the world-changing US software industry. He also disliked the political regime of the time and wanted to avoid compulsory national service. So, at 17, on the strength of his mother's Canadian citizenship, Musk moved to Canada by himself. He later transferred to the University of Pennsylvania, where he earned undergraduate degrees in physics and business.

ELECTRIC CAR

As a student, Musk's burgeoning interest in electric-powered motoring was set back by bad timing. In the 1990s, electric cars were associated with golf carts, and the motor industry refused to take them seriously, after a series of high-profile development efforts failed. However, battery power has advanced rapidly over the last decade. Tesla's Roadster runs on 6,831 lithium ion batteries, it can travel from 0–60mph in under four seconds and it costs around a penny a mile to operate.

There was logic behind Musk's decision to start with a sports car before bringing electric-powered motoring to the mass market. "We don't think the world lacks for a sports car," he says. "But it's the right entry point for the market. If you have a new technology, the right place to enter is high unit cost, low unit volume. Just as when a new mobile phone or laptop comes out, it tends to be expensive at first. You're figuring out the issues and it takes time to optimise. In time, the technology becomes cheaper. The idea is to enter the mass market as soon as possible, but only at the pace at which the technology matures."

At the moment, this looks like it might be around 2014, starting with an affordable family car that Tesla has codenamed BlueStar.

Tesla has not been without problems, however. The Tesla Roadster has hit a few speed bumps on its road to production. The main snag is that Tesla's transmission isn't strong enough to survive the process of shifting gears while the motor remains at full torque. Two suppliers are currently working simultaneously to resolve the problem. Meanwhile, the company has built the first production model at the Lotus factory in Hethel in the UK. Musk took delivery of the first car, which he accepts is fitted with a transmission that he knows will fail in a few thousand miles.

"Tesla's Roadster can travel from 0–60mph in under four seconds and it costs around a penny a mile to operate."

Tesla is considering shipping pre-ordered Roadsters to customers early, and then recalling these vehicles to install a stronger transmission later on. However, customers might baulk at the thought of spending $98,000 or more on a car with a gearbox that is likely to fail after a few thousand miles.

CLEANER MOTORING

The choice of electricity as a power source, argue Tesla's critics, means the Roadster is not an entirely clean technology. To Tesla's credit, though, it has teamed up with Solar City to provide solar panels that customers can install on the roof of their houses or garages to feed power to the outlet for the Tesla Roadster. Moreover, it is difficult to deny that Tesla has made an impressive start in ushering in a cleaner new age of motoring – the company has already sold all 600 of its 2008 cars.

It aims to produce 1,800 cars in 2009, and admirers of the Roadster are already putting down $5,000 refundable deposits for the chance to get one.