

SpaceX's Big Fucking Rocket: The Full Story

by Tim Urban



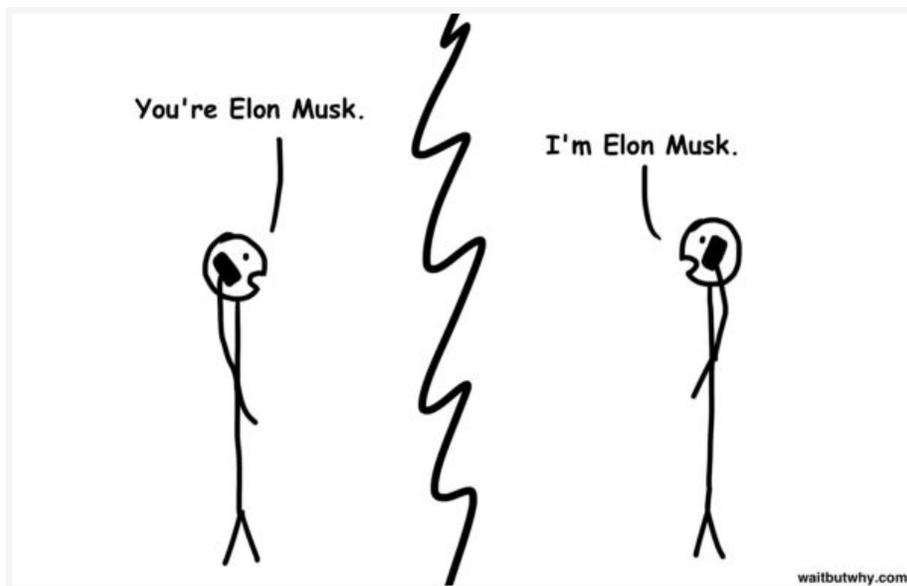
WAIT BUT WHY

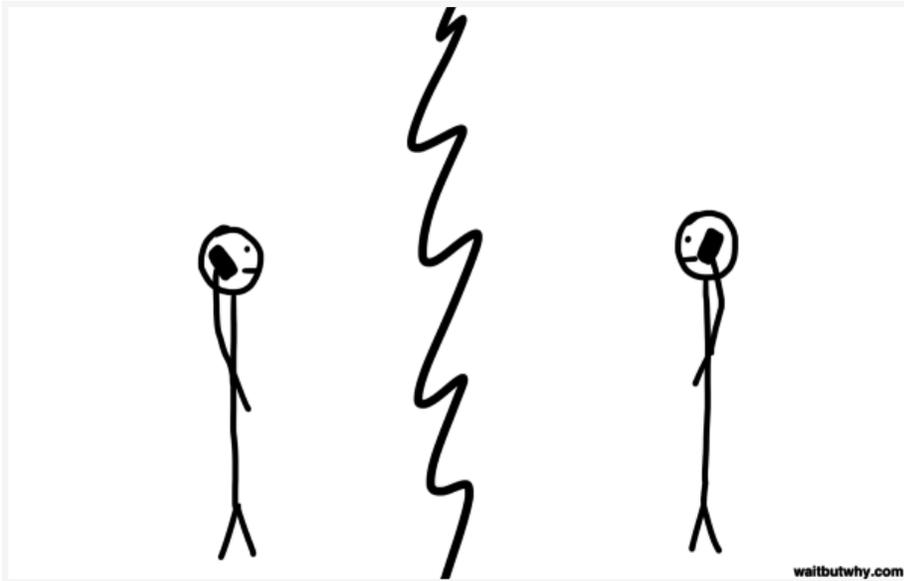
Yesterday, Elon Musk got on stage at the 2016 International Astronautical Congress and **unveiled the first real details** about the big fucking rocket they're making.

A couple months ago, when SpaceX first announced that this would be happening in late September, it hit me that I might still have special privileges with them, kind of grandfathered in from my time working with Elon and his companies in 2015 (which resulted in **an in-depth four-part blog series**). So I reached out and asked if I could learn about the big fucking rocket ahead of time and write a post about it.

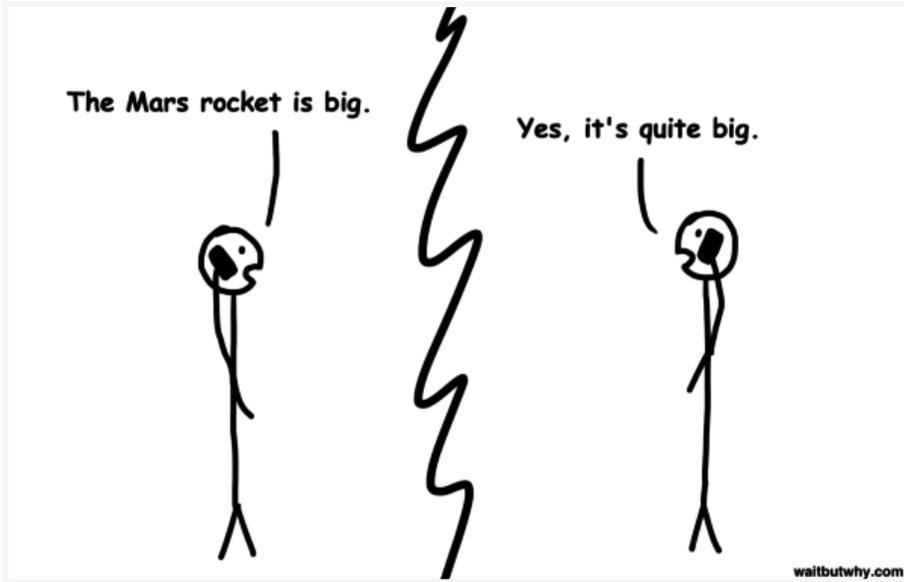
They said yes.

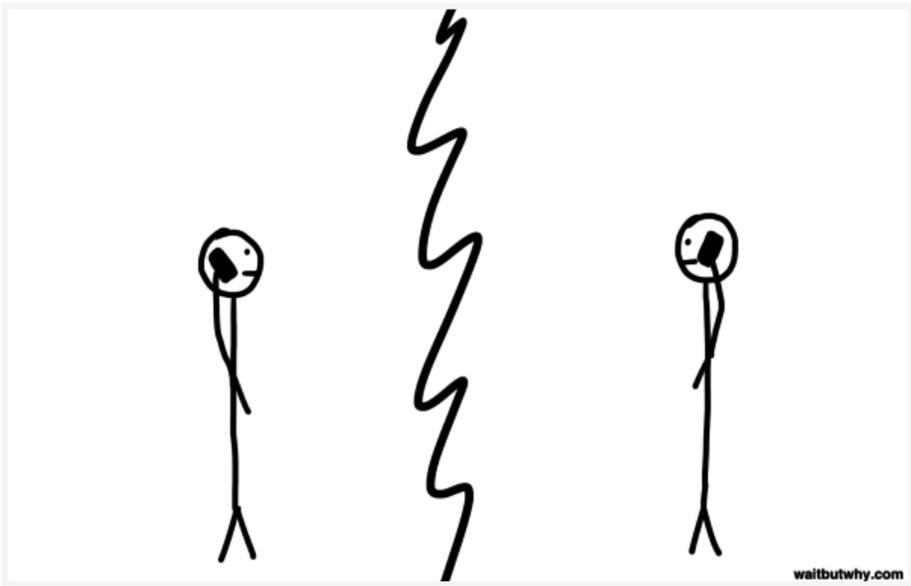
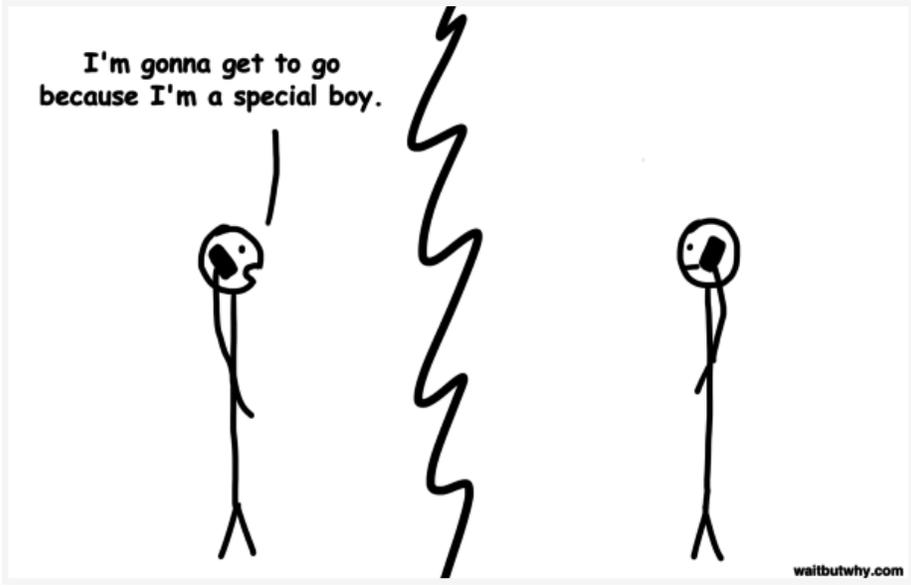
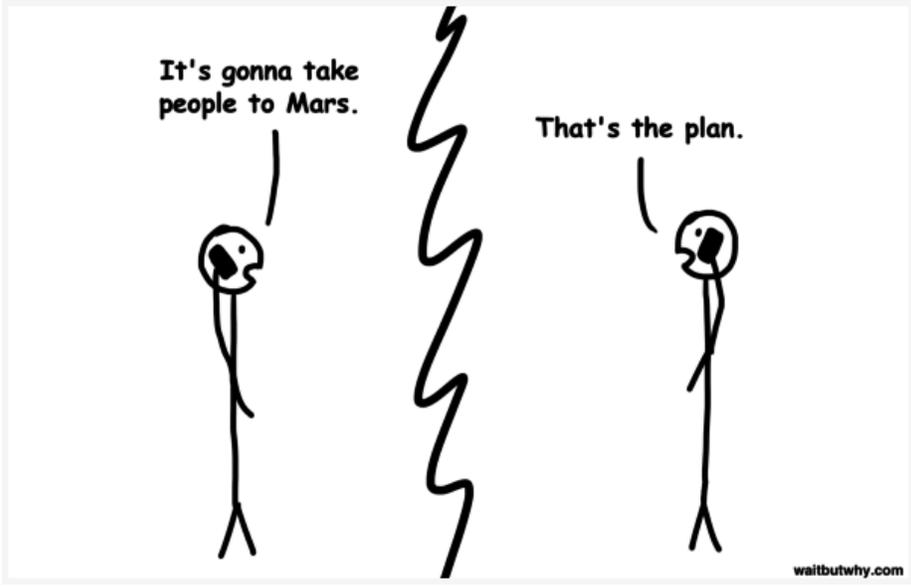
A little while later, I got on a call with Elon to discuss the rocket, the timeline, and the big plan this was all a part of. We started off how we always do.





Then I brought up the rocket.





Eventually, we were able to settle in to a fascinating conversation about this insane machine SpaceX is building and what's going to happen with it.

Now, before we get into things—

This post is only a piece of The SpaceX Story—one of the most amazing stories of our time—and a story I spent three months and 40,000 words telling last year. If you really want to understand this and you haven't read that post yet, I recommend you start there. The **post** has three parts, divided into five pages:

Part 1: The Story of Humans and Space

Part 2: Musk's Mission

Part 3: How to Colonize Mars

→ **Phase 1: Figure out how to put things into space**

→ **Phase 2: Revolutionize the cost of space travel**

→ **Phase 3: Colonize Mars**

For those who have read the post and want a refresher or those who just want to hear about the big fucking rocket and move on with their day, here's a quick overview of the background:

The Context

To understand why the big fucking rocket matters, you have to understand this sentence:

SpaceX is trying to make human life multi-planetary by building a self-sustaining, one-million-person civilization on Mars.

Let's go part by part.

Why make human life multi-planetary?

Two reasons:

1) It's fun and exciting. (**Here's a clip** from one of the interviews I did with Elon last year where he articulates this point.)

2) It's not a great idea to have all of our eggs in one basket. Right now we're all on Earth, which means that if something terrible happens on Earth—caused by nature or by our own technology—we're done. That's like having a precious digital photo album saved only on one not-necessarily-reliable hard drive. If you were in that situation, you'd be smart to back the album up on a second hard drive. That's the idea here. Elon calls it "life insurance for the species."

Why Mars?

Venus is a dick, with its lead-melting temperatures, its crushing atmospheric pressure, and its unbearable winds.

The moon has few natural resources, a 28-day day, and with no atmosphere to either provide protection against the sun during the day or warm things up at night, both day and night become murderous. Same deal on Mercury.

Jupiter, Saturn, Uranus, and Neptune are just huge balls of gas pretending to be planets.

Certain moons of Jupiter and Saturn are possibly habitable, but they're farther away and colder and darker than Mars, so why would we do that.

Pluto is even farther and colder and darker. Stop asking me about Pluto.

That leaves Mars. Mars isn't a good time. If Mars were a place on Earth, it's somewhere no one would want to go. But compared to all of those other options, it's a dream. It's cold but not that cold. It's kind of dark but not that much darker than Earth. It's far but not that far. Its day is almost the same length as ours, which is nice for us and hugely helpful for growing Earthly vegetation. Its surface gravity isn't crazy low or crazy high (it's around a third of Earth's). It has a ton of (frozen) water and a decent amount of CO₂, which are critical for early attempts at living there and hugely helpful for future attempts to "terraform" the planet into a place more livable for humans. All things considered, we're very lucky to have an option as good as Mars—in most other solar systems, we probably wouldn't.

Why 1,000,000 people?

Because Elon thinks that's a rough estimate for the number of people you'd need to have on Mars in order for the Mars civilization to be "self-sustaining"—with self-sustaining defined by Elon as: "Even if the spaceships from Earth permanently stop coming, the colony doesn't eventually die out—which requires a huge industrial base, and a much harder industrial base to create than being on Earth."