

Hello everybody, today I am going to talk about the “Starship”, a super heavy-lift launch vehicle under development by SpaceX.

First of all, I will explain the ambition of SpaceX in developing such a spacecraft. Then, I will do a presentation of this spacecraft with its capabilities, and I will conclude by the main achievements and the next steps of the program.

The ambition of SpaceX is to make a fully reusable transportation system, to carry both crew and cargo to Earth orbit, the Moon, Mars and beyond. Starship will be the world’s most powerful launch vehicle ever developed (according to SpaceX). For example, it’s twice more powerful than the Saturn five, which is the rocket of the Apollo eleven mission. SpaceX and Elon MUSK, the founder, want to make life multi-planetary by conquering Mars.

Starship is one hundred twenty meters high (higher than a soccer field), with a diameter of nine meters and a payload capacity between one hundred and two hundred fifty tons.

The Starship launch vehicle is composed of two main elements : the Super Heavy rocket and the Starship spacecraft.

The Super Heavy is the booster of the Starship launch system. It is sixty nine meters high, with a diameter of nine meters and a propellant capacity of three thousand four hundred tons. Powered by thirty three Raptor engines, it has in total a thrust of seventy four point four meganewtons. The booster is equipped with four electrically actuated grid fins, used to control the descent before a propulsive landing on the launch pad, where it will be caught by the recovery arms. According to Elon Musk, this technique would save the mass and cost of landing legs and immediately reposition the booster on the launch pad".

The spacecraft has a height of fifty meters, a diameter of nine meters, and a properlant capacity of one thousand two hundred tons. It is powered by six Raptor rocket engines, which give the thrust of fourteen point seven meganewtons. They burn a mixture of liquid oxygen and liquid methane. It controls its trajectory with four stabilization flaps, before landing vertically with its engines, making the vehicle reusable. It has the ability to transport up to one hundred people. Starship's heat shield is composed of thousands of hexagonal black tiles. They can withstand temperatures of one thousand four hundred celsius degrees.

The starship has six versions optimized for the launch of satellites, for transport of material, for manned flight, and for transfer fuel to other Starship.

Between April and August twenty nineteen, the Starhopper, a Starship prototype, succeeded in its four flight tests, which allowed the validation of the starship technology.

After four starship explosions, the first successful high-altitude test flight took place on May twenty twenty-one.

One week ago, the first static fire attempt of thirty three Raptor engines took place with success, even if two engines didn't turn on.

In march, an orbital test is planned.

Then, there will be missions to the moon and mars but the dates aren't confirmed yet.

With the success of last week, Starship is one step closer to Mars. Instead of designing a rocket for one specific mission, SpaceX has created the Swiss Army knife of space launchers.

It opens the way to new space services like earth tourism, for exemple Paris New-York in half an hour, space tourism around the moon and the earth, and why not the colonization of Mars.