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SPACE

Starbase, Texas: Elon Musk's plans to build the city of the future

If successful, the ambitious spaceport could become the site of multiple launches to the Moon and Mars

Elon Musk has made no secret of his intention to found a settlement on Mars, but his latest venture is to establish a city on Earth. Sited around SpaceX's launch site at Boca Chica, in Cameron County, south Texas, Musk's idea is to call the city 'Starbase, Texas'. It would house all those who work at the launch site, those who intend to launch from it, and be a tourist destination for people wanting to witness the awesome power of a launch.

Eventually, Musk hopes, it will be the point of departure for people travelling to Mars, with each mighty 'Starship' vehicle capable of transporting around 100 people at a time to the Red Planet. As they prepare for their flight, they will require the kind of living space and infrastructure that only a town or city can provide. Hence, transforming the village of Boca Chica into the city of Starbase, Texas, may be essential for Musk to realise his vision of space exploration.

Musk began the process of establishing his city in late February/early March 2021 when he officially approached Cameron County's administration. A press release from the county judge's office made it clear that Musk was to abide by all relevant statutes and that any application would ultimately be judged against applicable laws.

SpaceX announced its intention to build a launch facility at Boca Chica Village, on the US Gulf Coast, in 2014. This was following an extensive environmental assessment conducted

by the US Federal Aviation Authority. Whereas Musk launches his Falcon rockets at sites leased from NASA and the US government, the Boca Chica site is owned by SpaceX. It is right next to the village of Boca Chica and while most residents sold up to SpaceX and moved away, a few refused the deal. Rather controversially, they must now temporarily evacuate their homes whenever there is a launch – and there are many launches being planned.

Boca Chica is the home of Musk's most audacious space vehicle, the Starship, along with the giant rocket, called Super Heavy, that will launch it into space. It is unlike anything ever attempted before and upon completion, will be the most powerful rocket ever launched.

"It's a really ambitious project," says Josh Barker, from the National Space Centre in Leicester. "It ties into how SpaceX got to where they are, I think they're not afraid to try things."

As a result, SpaceX is ahead of the

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"Unlike the Saturn V, which was a single-use spacecraft, everything about Starship and the Super Heavy rocket is reusable"

curve. Unlike the small crew capsules that space agencies have traditionally used, Starship is a next-generation design. Standing 50 metres tall and 9 metres in diameter, much of its internal space will be living quarters, or converted to carry cargo. The Super



Heavy rocket is 70 metres tall, and will be powered initially by 29 Raptor engines, which are also manufactured by SpaceX in Texas.

Stacked one on top of the other, Starship and the Super Heavy rocket reach almost 120 metres in height, almost 10 metres taller than the Saturn V rockets that NASA used to launch

astronauts to the Moon in the late-1960s and early-1970s. It will be capable of generating almost twice the thrust of the NASA Moon rocket. Unlike the Saturn V, which was a single-use spacecraft, everything about Starship and Super Heavy is reusable. Both parts land



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“Starbase is undoubtedly set to become one of the most important launch sites on Earth”

vertically back on the launch pad at the end of the mission.

The launch site’s pace of development has been extraordinarily fast. Major construction work began in earnest in 2016, and the place became ready for test launches in 2019. Such accelerated progress has become something of a trademark for SpaceX, with Musk himself appearing to be a driven individual.

“I think he works his staff very, very hard,” says Barker. “He’s got a very strong work ethic and I think he demands that of his staff as well.”

The first major test flight at Boca Chica took place in December 2020, when a Starship launched into the air to test the vertical landing system. Despite getting off to a good start, it exploded when it came back into contact with the pad. Four more test flights were needed, before a Starship successfully touched down on 5 May 2021. If the previous tests proved anything, it was how robust the launch site was to explosive mishaps.

SpaceX began referring to the Boca Chica site as Starbase back in March and is now getting ready to launch its

first orbital test flight of the Starship and Super Heavy combination.

It has taken the company around 16 months of additional construction to prepare an orbital launch pad at the site. This includes a ‘launch table’ for the Super Heavy to sit on, a launch tower that will lift the Starship onto the Super Heavy and hold the giant rocket in place before ignition, and a ‘tank farm’ containing fuel and other liquids that will be pumped to the rocket before launch. A set of giant ‘arms’ have also been attached to the tower. Known as ‘Mechazilla’ they will literally catch the returning Super Heavy rocket and stabilise it as it makes its soft landing back on the pad.

Regardless of whether Musk’s plans to incorporate a city close to the launch site are given the go-ahead, Starbase is undoubtedly set to become one of the most important launch sites on Earth. This is because NASA has selected Starship to be the lunar lander in its Artemis program, so it is from here that the spacecraft that will return astronauts to the Moon will launch.

Although the astronauts will launch from Cape Canaveral, Florida, the Orion crew capsule they will be in will not be equipped to land on the lunar surface. Instead, an uncrewed Starship will be launched in advance from Boca Chica and be placed into a parking orbit around the Moon. It will await the arrival of the Orion capsule, dock with it, and allow the astronauts to transfer over. Then they will pilot the Starship down to the Moon’s surface and back again when the mission is done.

It will form a dress rehearsal of sorts for Musk’s eventual aim of Martian exploration. And even though it still sounds like science fiction, Barker thinks we should not underestimate Musk’s ambition to reach the Red Planet.

“We’ve seen that Elon can get things done. He has the drive to do it. I think there is a good chance that he will,” he says, before adding, “Or it will ruin him. And that’ll be the end of it.”

DR STUART CLARK

Stuart is an astronomy writer with a PhD in astrophysics.