

# Once Starship prototypes stop exploding, we could see an orbital launch this year

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Credit: SpaceX

SpaceX has had a lot of ups and downs lately. On Saturday, May 30, the company made history when their Crew Dragon spacecraft took off from the NASA Kennedy Space Center, carrying two astronauts to space. But just a day before, SpaceX engineers and ground crews watched their fourth Starship prototype (SN4) explode on its testbed during a static fire test, making it the fourth prototype in a row to be lost.

But according to recent news from a SpaceX engineer and executive, as

well as an internal email from Elon Musk to SpaceX employees, it is clear that the company is all-in with the Starship prototype and could conduct an orbital flight before the end of the year. An ambitious goal, but you don't get to be the head of a company that makes reusability a thing and restores domestic launch capability to US soil by being a pessimist.

Not long ago, SpaceX engineers determined the cause of the SN4 explosion, saying that it was the result of a propellant line disconnecting. This led to a major liquid methane leak that then ignited, leading to the spectacular explosion that completely destroyed the SN4. This is similar to what happened during the previous static fire [test](#) on May 19, when a small fire broke out near the base of SN4 due to a burst methane line.

Nevertheless, the Raptor engine had fired for a full two minutes before the rupture took place, which effectively completed the fifth static fire test of the engine. Combined with other successes, SpaceX's Chief Engineer Hans Königsmann recently indicated that hop tests could begin shortly, which bodes well for an orbital flight before 2020 is over. As he said during an interview with the German publication [Der Spiegel](#):

"I expect first test flights in, say, 150 meters altitude in the coming weeks. We'll do that a couple of times. If everything works out, we want to go into orbit at the end of the year. Or maybe it will take a little longer."

Coming from the company's chief engineer, this should not be taken idly. And he is correct in his estimation that an orbital flight could happen before the end of 2020, assuming that hop tests begin in the coming weeks. The first test would involve a single-engine prototype flying to an altitude of 150 m (~500 ft) and then making a controlled landing.

This would pick up where SpaceX left off with the Starhopper prototype, which completed a 150-meter hop test on August 25, 2019. Given all of the setbacks SpaceX has experienced this past year, one would think that it's a bit optimistic to assume that an orbital flight could take place just six months from now. But this is in keeping with SpaceX's rapid prototyping and iterative approach.

This method allows them to create prototypes rapidly, with small variations in design, and learn from every mistake. This is precisely what SpaceX has been doing since early 2020, which is to push them to their limits, replace them quickly, and use the combined data to improve the overall design. In this respect, SpaceX is following the same approach that NASA did back in the Apollo Era.

True to this approach, SpaceX is moving ahead with tests using their SN5 prototype, which engineers finished constructing at the company's South Texas Launch Site at Boca Chica. In addition, a company-wide email was recently obtained by CNBC in which Musk instructed employees to accelerate the development of the Starship "dramatically and immediately."

According to Musk, who circulated the email on Saturday, June 6, all SpaceX personnel were told, "Please consider the top SpaceX priority (apart from anything that could reduce Dragon return risk) to be Starship." This is appropriate, considering that with the successful launch of the Crew Dragon, SpaceX has fulfilled its responsibilities as part of NASA's Commercial Crew Program.

The aim of this program is to restore domestic launch capability to the US by creating crew-rated spacecraft that can carry astronauts to and from the International Space Station (ISS). The Crew Dragon was SpaceX's contribution to the program while Boeing's took the form of the [CST-100 Starliner](#) – which still needs to complete a successful

uncrewed and crewed mission to the ISS before it can be certified.

With the Crew Dragon certified, SpaceX's full attention can now be directed toward its next-generation super-heavy launch system. As with its predecessors, the next step will be to conduct a cryogenic load test followed by a static fire test of its lone Raptor engine. Once that's done, it's reasonable to assume SpaceX will mount a 150-meter hop test using the SN5 in the next few weeks.

Barring any additional setbacks, the SN5 could be fitted with a nosecone, flaps and three Raptor engines to perform a 20-km flight, which will conclude with a supersonic reentry and controlled landing. This will be the last step before a full-scale orbital flight using six Raptor engines can take place, followed by the finalizing of the Starship's design and the start of commercial production.

In the meantime, the company will also be working on the Super Heavy element of the launch system. Like the Starship, this will involve putting prototypes through pressure testing, engine tests, and progressively higher hop tests. Once integrated, the launch system will be able to fulfill SpaceX's commitment to provide payload and crew services in support of Project Artemis, conduct lunar tourism, and send people to Mars.

Both NASA and SpaceX hope to accomplish this in the next few years.

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