SPACEX STARSHIP ORBITAL TEST FLIGHT

The first Starship orbital test flight is scheduled to launch from Boca Chica, Texas, sometime in the later part of 2021

ACTUATED FLAPS
As the Starship steers toward its landing target, it is guided by the actuated forward and rear flaps which control pitch, yaw and roll.

STARSHIP S20
Upper stage: 164 feet/ 50 meters

1 At Starbase, Boca Chica, Texas, 29 Raptor engines will ignite on the Superheavy booster, launching Starship on its first orbital test flight.

2 Main Engine Cutoff (MECO): T-plus 2 minutes, 49 seconds

3A Stage Separation: T-plus 2 minutes, 51 seconds

3B As Superheavy falls back to Earth, four grid fins will help keepi steer the booster toward its landing target.

GRID FINS

4 Second Engine Start (SES): T-plus 2 minutes, 56 seconds

5 Second Engine Cutoff (SECO): T-plus 8 minutes, 41 seconds. The Starship will travel most of the way around the Earth with the plan to splashdown near the Hawaiian islands in the Pacific Ocean.

RCS THRUSTERS
Hot and cold gas Reaction Control System (RCS) thrusters located at various points on the orbiter and booster, help rotate, steer and stabilize the two stages.

6 Around 90 minutes after liftoff, Starship will re-enter the Earth's atmosphere.

7 Heat shield (thermal) tiles placed on the belly and flaps of the Starship will reduce the tremendous temperatures reached during the re-entry phase.

As it enters the atmosphere, a shock wave will form a short distance ahead of the Starship and a plasma layer will be created by ionization due to compression of the air molecules.

8 Starship will then free-fall most of the way, steered by the actuated forward and rear flaps. At an altitude of about 1,640 feet/ 500 meters, it will begin a "flip and burn"maneuver.

9 Two Raptor engines will reignite as the rocket performs the 90 degree "flip and burn" into a vertical landing orientation.

10 The two engines continue firing, gimbaling to help stabilize the now vertical rocket, reducing Starship's velocity and correcting its angle of descent for the splashdown approach.

11 Orbiter splashdown: 90 minutes, 20 seconds after launch, about 62 miles/100 kilometers northwest of Kauai, Hawaii. There is no official word of any plans for a full or partial recovery of the Starship from the ocean or even if it's expected to survive the splashdown.

SUPERHEAVY BN4
First stage booster: 238 feet/ 70 meters

3C Gimbled Raptor engines will ignite to reduce the booster's speed and stablize it for a soft landing. SpaceX has indicated Superheavy will attempt a controlled water landing, ditching in the Gulf, a safe distance from population zones and the Starbase construction and launch site.

3D Booster Touchdown: T-plus 8 minutes, 15 seconds about 38 kilometers/ 19 miles offshore from Boca Chica in the Gulf of Mexico. Should the Superheavy survive the splashdown, it has yet to be confirmed whether a recovery operation is planned for any part of the booster.

STARSHIP ORBITAL TEST FLIGHT ROCKET
SpaceX Space Launch Facility, Boca Chica, Texas, USA

COMBINED HEIGHT: 394 feet/120 meters
STARSHIP S20: 164 feet/50 meters
SUPERHEAVY BN4: 238 feet/70 meters

DIAMETER: 29 feet/9 meters

PROPULSION (COMBINED): 35 Raptor engines
STARSHIP S20: Three sea level Raptor engines/Three Vacuum Raptor engines
SUPERHEAVY BN4: 29 sea level Raptor engines

BOCA CHICA
GULF OF MEXICO
HAWAII
Kauai
PACIFIC OCEAN
UNITED STATES
CANADA
CHINA
NORTH POLE
RUSSIA
NORTH ATLANTIC OCEAN
EUROPE

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