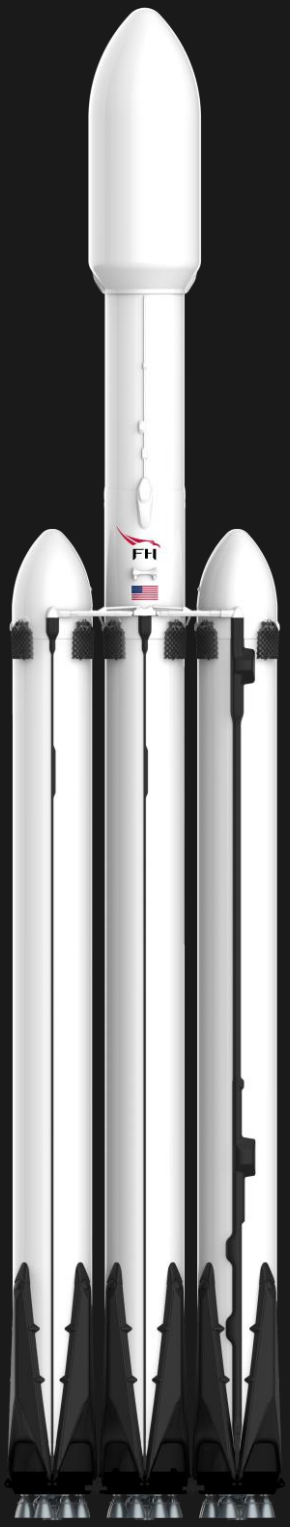

FALCON HEAVY
THE WORLD'S MOST POWERFUL ROCKET

OVERVIEW

Falcon Heavy is the most powerful operational rocket in the world by a factor of two. With the ability to lift into orbit nearly 64 metric tons (141,000 lb) Falcon Heavy can lift more than twice the payload of the next closest operational vehicle, the Delta IV Heavy. Falcon Heavy is composed of three Falcon 9 nine-engine cores whose 27 Merlin engines together generate more than 5 million pounds of thrust at liftoff, equal to approximately eighteen 747 aircraft.



HEIGHT	70 m / 229.6 ft
DIAMETER	12.2 m / 39.9 ft
MASS	1,420,788 kg / 3,125,735 lb
PAYLOAD TO LEO	63,800 kg / 140,660 lb
PAYLOAD TO GTO	26,700 kg / 58,860 lb
PAYLOAD TO MARS	16,800 kg / 37,040 lb

FIRST STAGE

Three cores make up the first stage of Falcon Heavy. The side cores, or boosters, are connected on the nosecone, the interstage, and on the octaweb. Shortly after liftoff the center core engines are throttled down. After the side cores separate, the center core engines throttle back up to full thrust.

NUMBER OF ENGINES	27
THRUST AT SEA LEVEL	22,819 kN / 5.130.000 lbf
THRUST IN VACUUM	24,681 kN / 5,548,500 lbf

MERLIN

Merlin is a family of rocket engines developed by SpaceX for use on its Falcon 1, Falcon 9 and Falcon Heavy launch vehicles. Merlin engines use RP-1 and liquid oxygen as rocket propellants in a gas-generator power cycle. The Merlin engine was originally designed for recovery and reuse

Falcon Heavy's first stage incorporates 27 Merlin engines across three aluminum-lithium alloy rocket cores containing liquid oxygen and rocket-grade kerosene (RP-1) propellant. Falcon Heavy generates more than 5 million pounds of thrust at liftoff.

PROPELLANT	LOX / RP-1
THRUST	845 kN / 190,000 lbf

MERLIN VACUUM

Merlin Vacuum features a larger exhaust section and a significantly larger expansion nozzle to maximize the engine's efficiency in the vacuum of space. Its combustion chamber is regeneratively cooled, while the expansion nozzle is radiatively cooled. At full power, the Merlin Vacuum engine operates with the greatest efficiency ever for an American-made hydrocarbon rocket engine.

PROPELLANT LOX / RP-1

THRUST 981 kN / 220,500 lbf

LANDING LEGS

The Falcon Heavy first stage is equipped with 12 landing legs (4 on each booster) made of state-of-the-art carbon fiber with aluminum honeycomb.

All 12 landing legs are stowed along the side of each booster until just prior to landing.

INTERSTAGE

The interstage is a composite structure that connects the center core on the first stage and second stages and holds the release and separation system.

GRID FINS

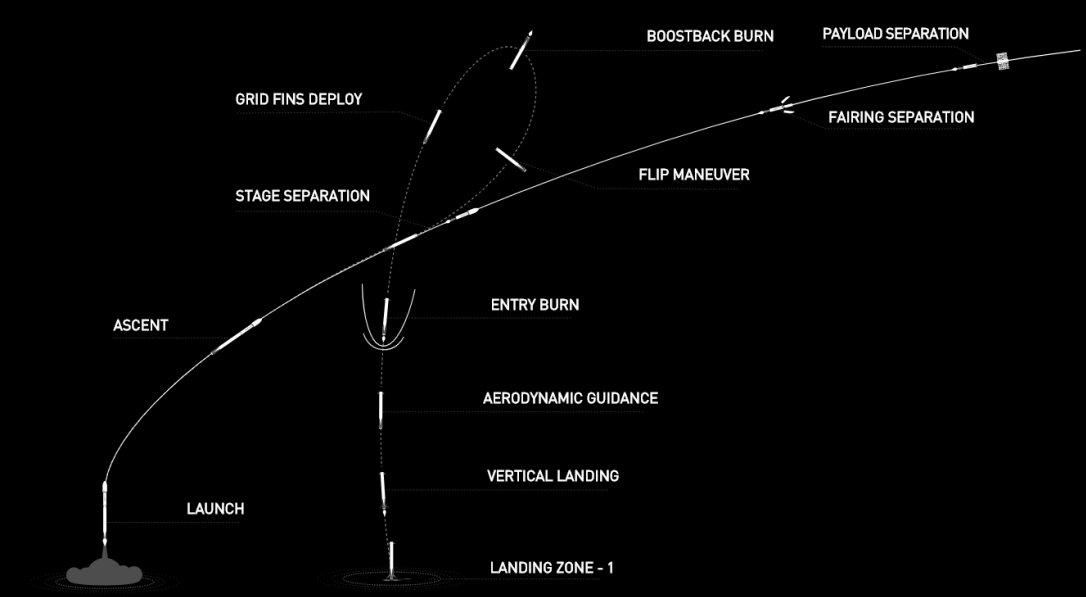
Falcon Heavy is equipped with 12 hypersonic grid fins, four on each booster, positioned at the base of the interstage or nosecone which orients by moving the center of pressure during reentry.

REUSABILITY

SpaceX believes a fully and rapidly reusable rocket is the pivotal breakthrough needed to substantially reduce the cost of space access. The majority of the launch cost comes from building the rocket, which historically has flown only once.

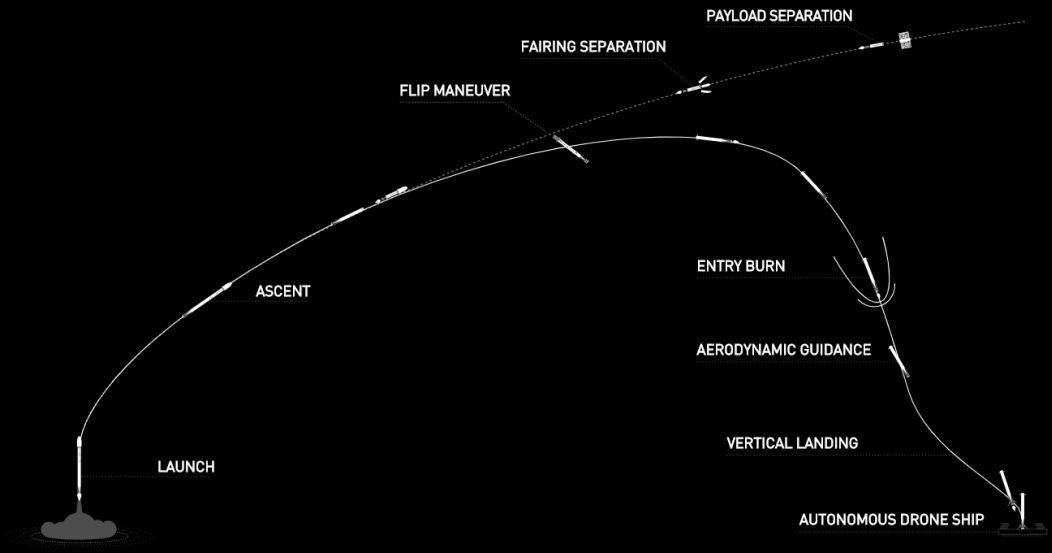
Compare that to a commercial airliner – each new plane costs about the same as Falcon 9 but can fly multiple times per day and conduct tens of thousands of flights over its lifetime. Following the commercial model, a rapidly reusable space launch vehicle could reduce the cost of traveling to space by a hundredfold.

While most rockets are designed to burn up on reentry, SpaceX rockets can not only withstand reentry but can also successfully land back on Earth and refly again.



LANDING

SpaceX's family of Falcon launch vehicles are the first and only orbital class rockets capable of reflight. Depending on the performance required for the mission, Falcon lands on one of our autonomous spaceport droneships out on the ocean or one of our landing zones near our launch pads.



SECOND STAGE

Falcon Heavy draws upon Falcon 9's proven design, which minimizes stage separation events and maximizes reliability. The second-stage Merlin Vacuum Engine delivers the rocket's payload to orbit after the main engines cut off and the first-stage cores separate.

NUMBER OF ENGINES	1
BURN TIME	397 sec
THRUST	981 kN / 220,500 lbf

PAYLOAD

Made of a carbon composite material, the fairing protects satellites on their way to orbit. SpaceX is recovering fairing for reuse on future missions.