Space X

Space Exploration Technologies Corporation

Words you should know:

Max Q - “Maximum dynamic pressure” The point where the spacecraft reaches it’s greatest mechanical pressure on its structure.

LEO - Low Earth Orbit, region of space where satellites orbit closest to the earth’s surface. Usually 2000km or less.

GEO - Geosynchronous Orbit, region of space where a satellite matches the earth’s rotation. A satellite will look stationary at one point in the sky. 35,786km

Elon Musk

Founder of PayPal
Co-founder of Tesla
Created SpaceX
- initially wanted to purchase Russian rockets
- decided to make his own rockets
- wanted to reduce the cost of launching into space

Falcon 1

Omelek Island (Kwajalein Atoll) Marshall Islands

2 Stage Rocket

First 3 launches failed

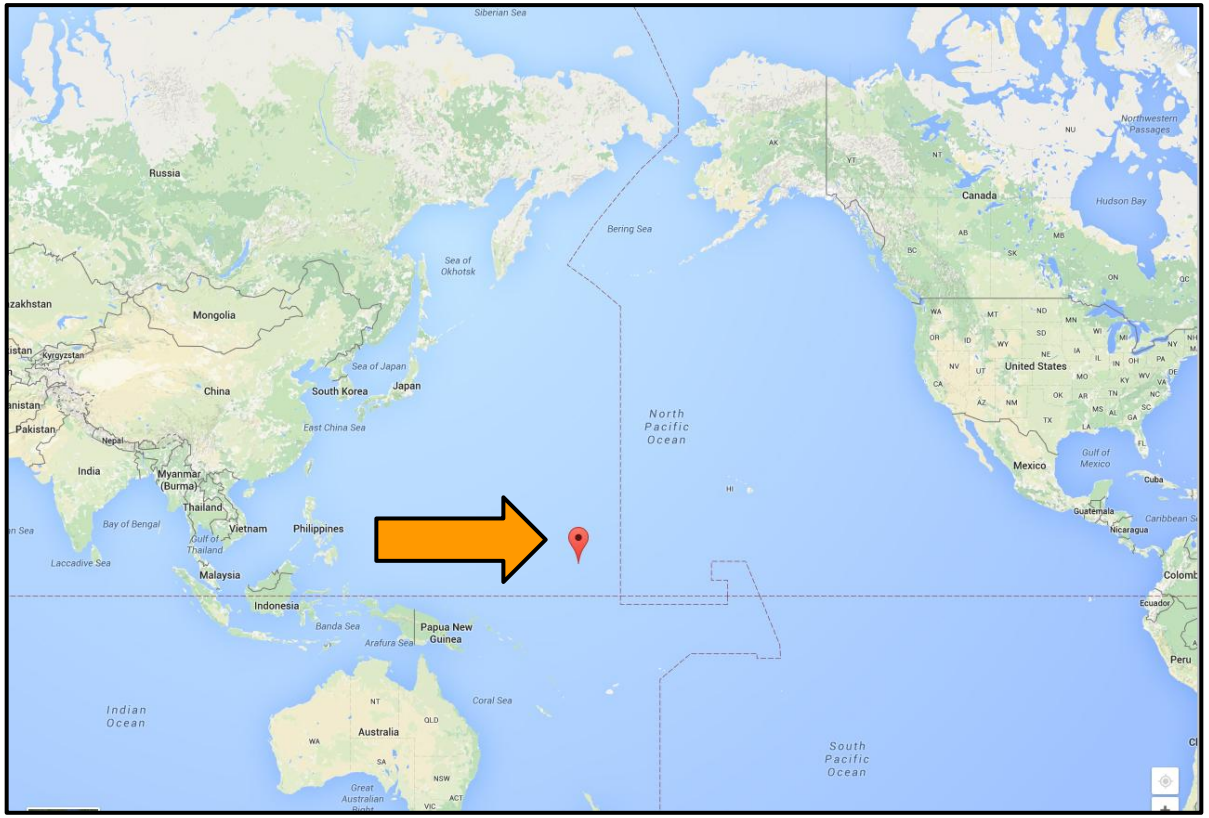
4th launch (made of spare parts) was successful which made SpaceX the first private company to launch a privately funded and developed rocket into orbit.

Did you know that the name “Falcon” was named after the “Millenium Falcon” from Star Wars?

Launched 1x more time, then was decommissioned for the Falcon 9 rocket.

1st stage was originally planned to be reusable by using a parachute.

Falcon 1 - Omelek Island (Kwajalein Atoll) Marshall Islands



Falcon 9

Made of 2 stages, with the 1st stage designed to be reusable.

Falcon 9

First launched on June 4th, 2010

-Falcon 9 made the cost of going to space less expensive
-This year almost 100 flights launched
-Sends humans to space and the international space station

9 engines
Carries more weight than Falcon 1
- 22,800 kg to leo
- 8,300 kg to gto

Capsules sending humans and supplies to the International Space Station are called “Dragon”

SpaceX Iterative Process - Lessons from failures

Falcon Heavy

Designed to carry more payload into space. Largest and most powerful rocket until Starship

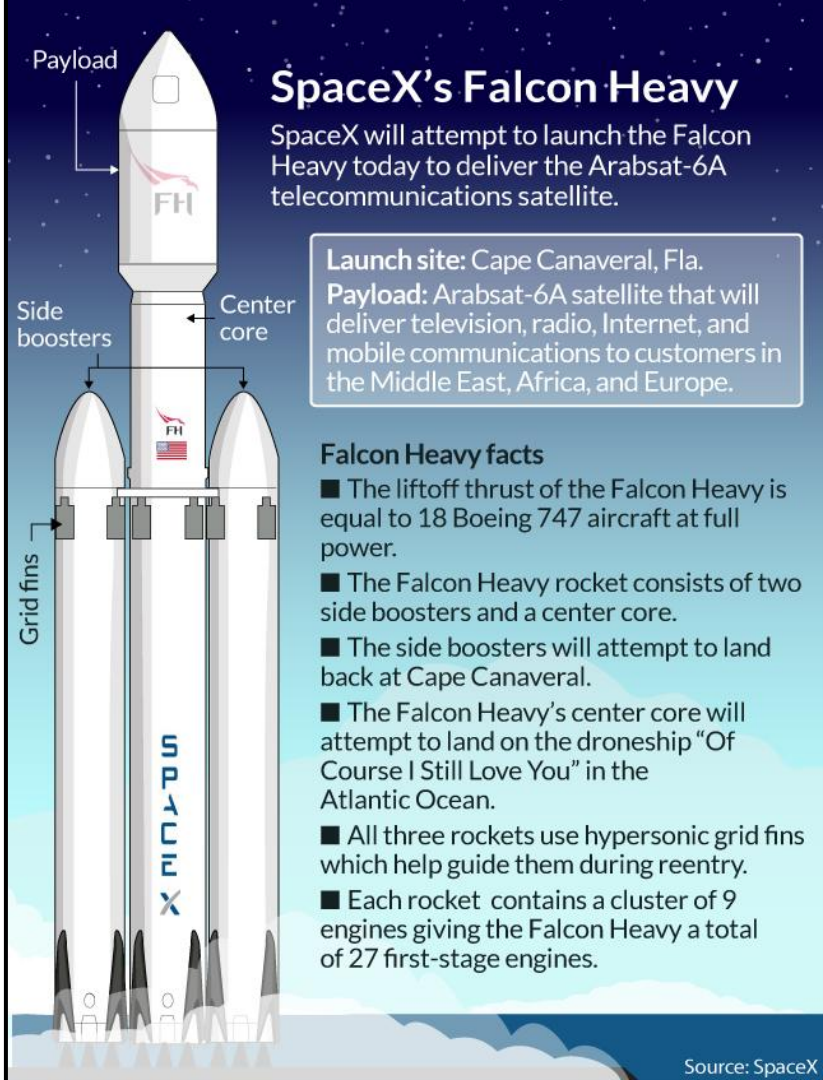
Consists of a Center Core with 2 Falcon 9's.

2nd stage on top of the center core

2nd highest payload capacity of any operational rocket behind the SLS

Maiden Flight on February 2018

- 63,800 kg to leo
- 26,700 kg to gto



Starship

Largest and most powerful rocket. Designed to carry more than 150 tons of cargo into space and be fully reusable.

Super-heavy lift launch vehicle intended to replace the Falcon 9 and Falcon Heavy

Uses the ***iterative*** process for development

Iterative - an approach to continuously improving a concept, design, or product

First Test Flight on April 2023

Second Test Flight on November 2023

Third Test Flight - To be determined (TBA)

150,000 kg to leo

250,000 kg (expendable)

21,000 kg to geo

Starship


N45°
N35°
Boca Chica
N25°
Tropic of Cancer
W115°
W105°
W 95°
W 85°
W 75°
N15°


San Angelo
TEXAS
Killeen
Round Rock
College Station
Austin
Lufkin
Spring
Beaumont
Orange
Katy
Houston
New Braunfels
San Antonio
Sugar Land
Galveston
Uvalde
TEXAS!
Victoria
Negras
Rockport
Corpus Christi
Laredo
Gulf of Mexico
Mexico
SpaceX Boco Chica
NUEVO LEON
McAllen
Reynosa
Monterrey
Matamoros

Starship

- Cost of Artemis - $4.1 billion dollars
- Cost of Starship Launch - $100 million, eventually to $10 million
- Consists of 2 stages:
  - 1. Superheavy (Booster)
  - 2. Starship

Starship - *Starhopper launches in July/August 2019*

Starship - SN5 August 2020

Starship - SN8 December 2020

Starship - SN15 May 2021

Starship - 1st Intergrated Test of Superheavy (booster) and Starship

Starship

Starship

Starship