ROCKET SCIENCE:

A Beginner's Guide To Launch

ROCKETWEIGHT

At liftoff, a ULA rocket weighs more than 80 African elephants

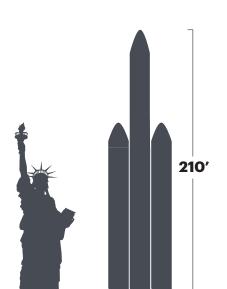
ROCKET

- 1 Payload: Satellite or spacecraft carried by a rocket.
- 2 Payload Fairing: Encloses the delicate satellite or spacecraft and protects it from the Earth's atmosphere.
- **3 Upper Stage:** The upper stage is ignited after the booster is jettisoned to push the payload to the required separation point.
- **4 First Stage:** The booster engine is shut down and then the first stage jettisons to allow the upper stage to continue.
- 5 Solid Rocket Boosters: Solid rocket boosters, ignited at liftoff, give the rocket extra thrust to lift larger payloads.
- **6 Main Engine:** Produces thrust that lifts the rocket off the ground.



ROCKET SPEED

ULA rockets travel at approximately: 22,000 mph or 22x faster (1,000 mph) than a fighter jet



ROCKET HEIGHT

The average ULA rocket is 210 feet tall or about 1.5x the height of the Statue of Liberty

PAYLOAD WEIGHT

ULA rockets have launched 50,000-lb spacecraft







3 – 2 – 1... LIFTOFF!

While there are different types of rockets, these are the basic steps that take place when a rocket is launched into space.

The upper stage engine ignites, pushing the rocket farther along its path. Some missions, like those to the International Space Station are about 15 minutes. Others, to

geosynchronous orbit, can take up 8 hours and require multiple upper stage engine burns. The payload separates from the rocket and begins its mission in space.

The payload fairing jettisons, revealing the payload.

The booster engine is shut down and then the stage jettisons to allow the upper stage to continue.

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Rockets, also called launch vehicles, play an important role in our lives every day. Rockets carry satellites and spacecraft from Earth to space. Once delivered to space, they transmit navigation signals to our GPS devices, take images of Earth, explore our solar system and help protect our troops by enabling them to communicate with each other—just to name a few of their uses.

The main engine and solid rocket boosters ignite to lift the rocket off the pad.



The solid rocket

boosters burn out of propellant and jettison from the rocket.

