The propulsion system is the heart of the rocket. There are three main types:

- **Solid Propellant** – Simple and reliable but cannot be throttled or stopped once ignited. Used in amateur and military rockets.
- **Liquid Propellant** – More complex but allows for better control. SpaceX's Falcon 9 and NASA's Saturn V use liquid engines.
- **Hybrid Propellant** – A mix of solid and liquid fuels, offering better control while maintaining simplicity.

For small-scale rockets, commercially available solid rocket motors (such as those used in amateur rocketry) can be used. However, for a serious space launch vehicle, liquid-fueled engines like RP-1/LOX (kerosene and liquid oxygen) or cryogenic fuels (like hydrogen and oxygen) are necessary.

4. Assembling the Rocket

Building the rocket involves fabricating its components, including:

- **The Airframe** – Made from lightweight metals or composites.
- **The Engine and Fuel Tanks** – Precision-manufactured to handle high pressures.
- **The Avionics System** – Includes computers, sensors, and communication systems to control the rocket.
- **Recovery System** – If designing a reusable rocket, parachutes or controlled reentry mechanisms must be included.

Depending on scale, manufacturing may require access to CNC machines, 3D printing, and welding.

5. Testing and Iteration

No rocket is perfect on the first attempt. Testing is crucial to refine the design:

- **Static Fire Test** – Firing the rocket engine while it's fixed in place to measure thrust and efficiency.
- **Wind Tunnel Testing** – Ensuring aerodynamic stability.
- **Subscale Flight Tests** – Launching small versions of the rocket before full-scale deployment.

Failures are expected in rocket development. SpaceX, for example, experienced multiple failures before achieving reliable launches. Each failure provides data for improvement.

6. Launch and Regulations

Launching a rocket requires strict adherence to regulations. Most countries have government agencies, like the **FAA (Federal Aviation Administration) in the U.S.**, that regulate rocket launches. Permits and safety measures must be in place, including: