Indian Inventions

Agnibaan Rocket

(Agnikul Cosmos)

Introduction

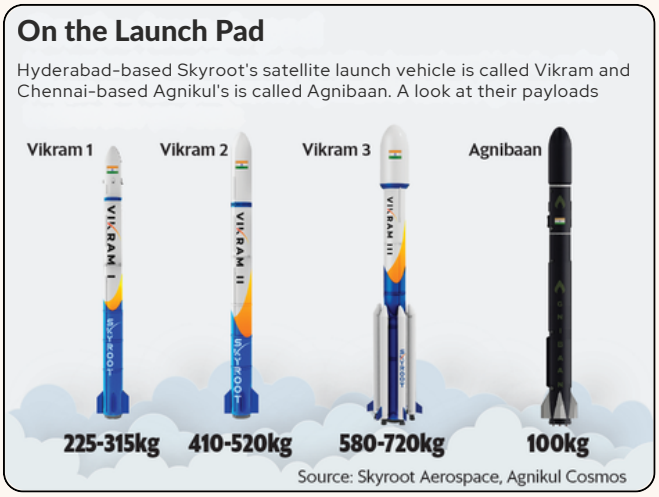
For decades, space missions were led only by national agencies. But today, a new wave is transforming space science and **private space startups.**

One of the most exciting among them is Agnikul Cosmos, which developed the Agnibaan Rocket, a launch vehicle built in India with cutting-edge technology like **3D - printed rocket engines.**

This is not just a rocket story. It is about **innovation, entrepreneurship, and how young Indians are shaping the future of space technology.**

What is Agnibaan Rocket?

Agnibaan is a **small satellite launch vehicle (SSLV)** designed to carry lightweight satellites into space. It is flexible, customizable, and designed for quick launches.



Why is it important?

Today, many applications depend on small satellites:

- Weather forecasting
- Agriculture monitoring
- Communication
- Disaster management

Traditional rockets are expensive and not flexible for small payloads. Agnibaan solves this problem.

Where is it launched from?

Agnibaan is launched from **Satish Dhawan Space Centre.**

Agnikul has also built its own **private launchpad** within this spaceport, which is a first in India!

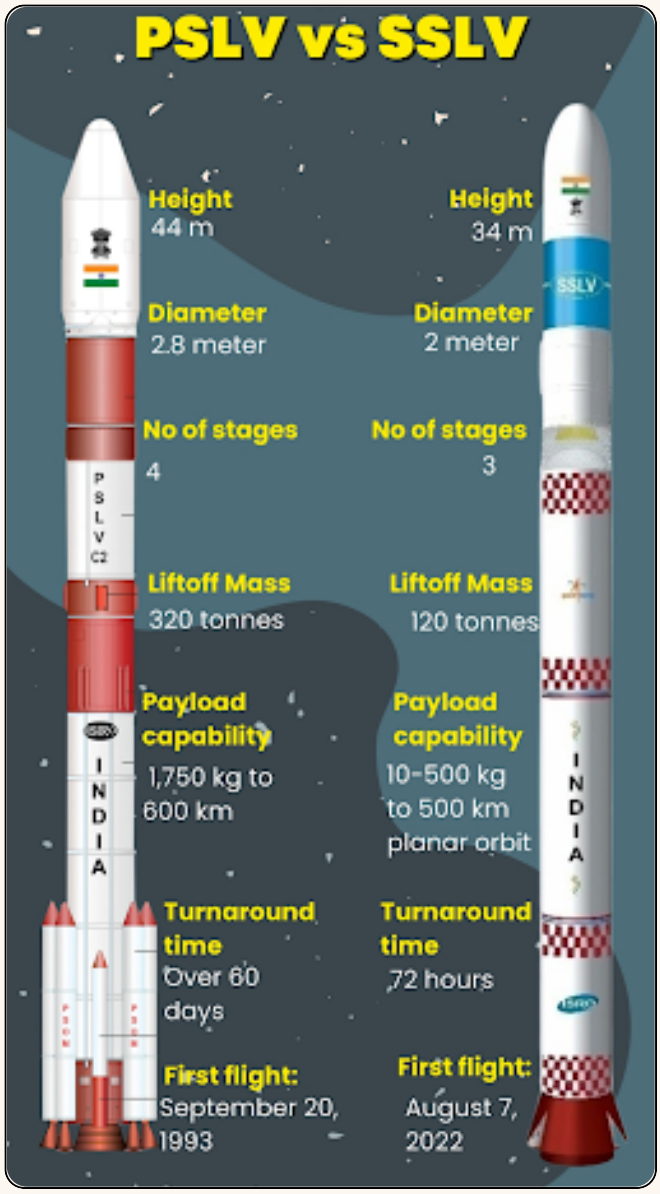
When did it launch?

The suborbital test mission **Agnibaan SOrTeD** was successfully launched in **2024**, marking a milestone in India's private space journey.

Who built it?

Agnibaan was developed by:

- **Agnikul Cosmos**
- Founded by young engineers from IIT Madras



The Problem

Challenges in traditional space launches:

- High cost
- Long waiting time
- Lack of flexibility

Why does India need this?

India is growing in:

- Startups
- Satellite technology
- Digital services

There is a need for **fast, affordable launch systems.**

Opportunity

- Growth of private space companies
- Job creation
- Innovation ecosystem

Definitions

1. Small Satellite (CubeSat)

A compact satellite used for research and communication.

2. Launch Vehicle

A rocket that carries payloads into space.

3. 3D Printing (Additive Manufacturing)

A process of building objects layer by layer.

4. Orbit

The path followed by a satellite around Earth.

Agnibaan Rocket

Core Idea

To create a **customizable, low-cost rocket** that can launch small satellites on demand.

Rocket Variants

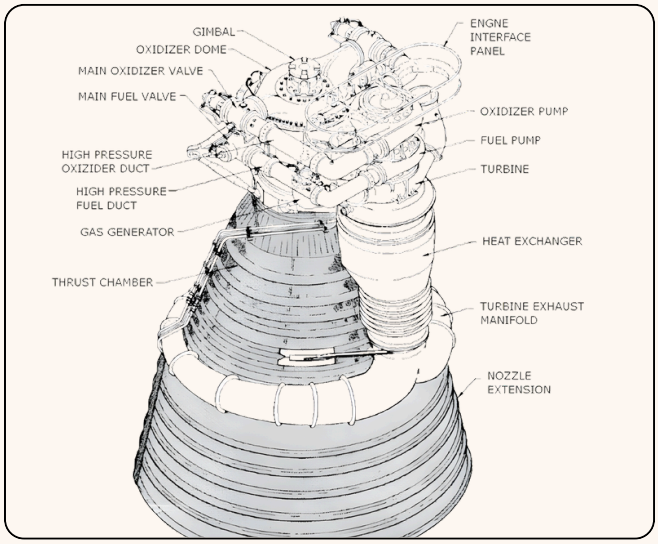
Agnibaan offers multiple configurations depending on payload size.

The Engine: SAgE

Key Features:

- Fully **3D-printed engine**
- Uses **semi-cryogenic fuel** (liquid oxygen + kerosene/methane variants)
- Faster manufacturing
- Reduced cost

First of its kind in India!



Teacher - led classroom activity

The teacher can begin by asking students:

- What is a rocket and how does it reach space?

Then guide the discussion with questions like:

- Why do we need small launch vehicles?
- What kind of satellites require such rockets?
- How can private companies contribute to space technology?

Introduce the Agnibaan rocket as a launch vehicle developed by an Indian startup and ask:

- How is it different from large rockets?
- What advantages do small rockets offer?

Encourage students to think about cost, flexibility, and quick launches. Conclude by discussing how innovations like Agnibaan are opening new opportunities in India's space sector and inspiring young innovators.

How It Works: Methods & Procedures

Rocket Launch Steps

1) Fuel loading 2) Engine ignition
3) Lift - off 4) Stage separation
5) Satellite deployment

Student Example

Blowing up a balloon and releasing it, air rushes out, and the balloon moves forward. Rockets work similarly!

Daily Life Connection

- Satellite TV
- GPS navigation
- Weather apps
- Disaster alerts

All depend on satellites launched by rockets like Agnibaan.

Advantages

- Low - cost launches
- Quick turnaround time
- Customizable missions
- Boosts private innovation

Limitations

- Smaller payload capacity
- Still under development
- Competition from global companies

Answer in your own words

- How can rockets be made reusable?
- Can we reduce fuel consumption?
- What materials can withstand high temperatures?

Conclusion

Agnibaan is not just a rocket; it is a **symbol of India's new space age**, where students, startups, and scientists come together to innovate.

It proves that:

- Innovation is not limited to big organisations
- Young minds can create big change
- India is ready to lead in space technology

The sky is no longer the limit. It is just the beginning.