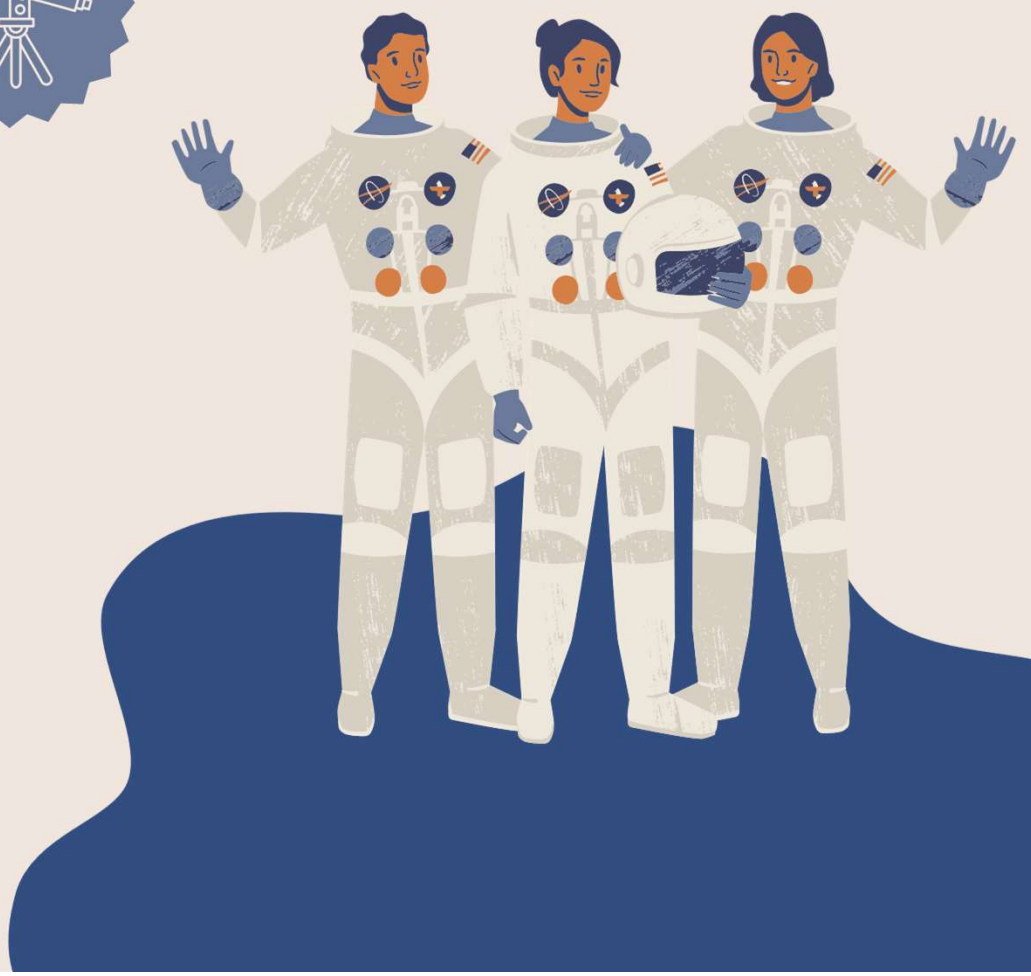
EXPLORING THE SPACE MISSIONS

BY- JEEVIKA SHARMA

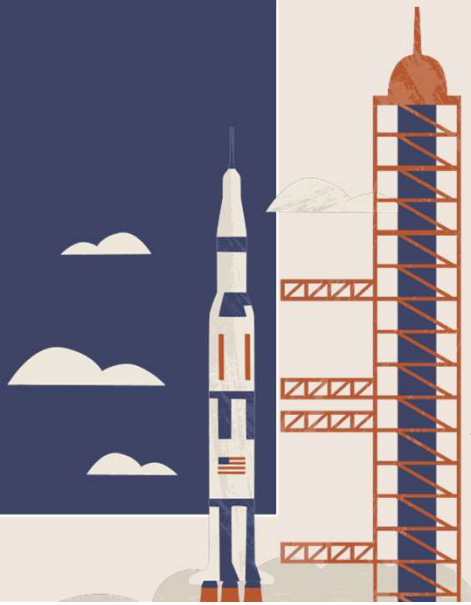


PROJECT OVERVIEW

Objective- **To analyze global space missions from 1964 to August 2022, identifying trends, success rates, and the contributions of different countries and organizations.**

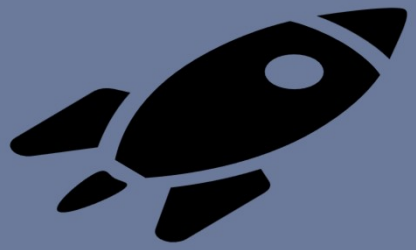
Data Source- **Available at Maven Analytics.**

Tools Used- **Microsoft PowerBi**



INTRODUCTION TO DATASET

Data Access- **Click on the rocket icon to access dataset.**



	Company	Location	Date	Time	Rocket	Mission	RocketSta	Price	MissionStatus
2	RVSN USSR	Site 1/5, B	04-10-1957	19:28:00	Sputnik 8K	Sputnik-1	Retired		Success
3	RVSN USSR	Site 1/5, B	03-11-1957	02:30:00	Sputnik 8K	Sputnik-2	Retired		Success
4	US Navy	LC-18A, Ca	06-12-1957	16:44:00	Vanguard	Vanguard '	Retired		Failure
5	AMBA	LC-26A, Ca	01-02-1958	03:48:00	Juno I	Explorer 1	Retired		Success
6	US Navy	LC-18A, Ca	05-02-1958	07:33:00	Vanguard	Vanguard '	Retired		Failure
7	AMBA	LC-26A, Ca	05-03-1958	18:27:00	Juno I	Explorer 2	Retired		Failure
8	US Navy	LC-18A, Ca	17-03-1958	12:15:00	Vanguard	Vanguard '	Retired		Success
9	AMBA	LC-5, Cape	26-03-1958	17:38:00	Juno I	Explorer 3	Retired		Success
10	RVSN USSR	Site 1/5, B	27-04-1958	09:01:00	Sputnik 8A	Sputnik-3 (	Retired		Failure
11	US Navy	LC-18A, Ca	28-04-1958	02:53:00	Vanguard	Vanguard '	Retired		Failure
12	RVSN USSR	Site 1/5, B	15-05-1958	07:12:00	Sputnik 8A	Sputnik-3 (	Retired		Success
13	US Navy	LC-18A, Ca	28-05-1958	03:46:00	Vanguard	Vanguard '	Retired		Failure
14	US Navy	LC-18A, Ca	26-06-1958	05:00:00	Vanguard	Vanguard '	Retired		Failure
15	US Navy	Douglas F4	25-07-1958		NOTS-EV-1	Pilot-1 (D1	Retired		Failure
16	AMBA	LC-5, Cape	26-07-1958	15:00:00	Juno I	Explorer 4	Retired		Success
17	US Navy	Douglas F4	12-08-1958		NOTS-EV-1	Pilot-2 (D2	Retired		Failure
18	US Air Force	SLC-17A, C	17-08-1958	12:18:00	Thor-DM 1	Pioneer 0	Retired		Failure
19	US Navy	Douglas F4	22-08-1958		NOTS-EV-1	Pilot-3 (D3	Retired		Failure
20	AMBA	LC-5, Cape	24-08-1958	06:17:00	Juno I	Explorer 5	Retired		Failure
21	US Navy	Douglas F4	25-08-1958		NOTS-EV-1	Pilot-4 (R1	Retired		Failure
22	US Navy	Douglas F4	26-08-1958		NOTS-EV-1	Pilot-5 (R2	Retired		Failure
23	US Navy	Douglas F4	29-08-1958		NOTS-EV-1	Pilot-6 (R3	Retired		Failure
24	RVSN USSR	Site 1/5, B	23-09-1958	07:40:00	Vostok	E-1 nâ€ Â-	Retired		Failure
25	US Navy	LC-18A, Ca	26-09-1958	15:38:00	Vanguard	Vanguard '	Retired		Failure
26	NASA	SLC-17A, C	11-10-1958	08:42:00	Thor-DM 1	Pioneer 1	Retired		Partial Failure
27	RVSN USSR	Site 1/5, B	11-10-1958	21:41:00	Vostok	E-1 nâ€ Â-	Retired		Failure

space_missions | Dictionary | +

DATASET DESCRIPTION

Total Records: 4631 missions

Key Attributes:

- Company: Company responsible for the space mission
- Location: Location of the launch
- Date: Date of the launch
- Time: Time of the launch (UTC)
- Rocket: Name of the rocket used for the mission
- Mission: Name of the space mission (or missions)
- RocketStatus: Status of the rocket as of August 2022 (Active or Inactive)
- Price: Cost of the rocket in millions of US dollars
- MissionStatus: Status of the mission (Success, Failure, Partial Failure, Prelaunch Failure)

DATA PREPROCESSING

- Data Cleaning and transformation:

  Removing Nulls, duplicates, changing datatype and replacing values

- Creating New Measures
- Data Loading in PowerBi

QUESTIONS TACKLED

- How have rocket launches trended across time? Has mission success rate increased?
- Which companies have had the most successful space missions? Has it always been that way?
- Which rocket has been used for the most space missions? Is it still active?
- Are there any patterns you can notice with the launch locations?

TRENDS IN ROCKET LAUNCHES OVER TIME

Visual:

Line Chart: Shows Number of rocket launches per year from 1964 to 2022.

Key Findings:

Launch frequency has seen a significant rise in the past decades.

In 2021, there are maximum number of launches , specifically 122 successes, 5 Failures and 1 Partial Failure.

Mission success rates have improved significantly since 2010, reflecting advancements in rocket technology and operational practices.

COMPANIES VS SPACE MISSION ANALYSIS

Visual:

Bar Chart: Shows Number of successful rocket launches by respective company

Key Findings:

The USA and Russia have traditionally led in successful missions, but recent years have seen significant contributions from China and private companies in the USA.

- **CASC, NASA, SpaceX, Arianespace, ULA, Northrop, ISRO are top 7 leading companies in terms of number of successful missions launched.**

- **The countries associated with these companies are primarily the China, United States, France, and India.**

THE MOST FREQUENTLY USED ROCKET

Visual:

- **Bar Chart:** Number of missions by rocket type.
- **Status Indicator:** Current status of these rockets (Active/Retired).

Key Findings:

The Falcon 9 Block 5 by SpaceX has been used for the most missions and remains active, reflecting its reliability and cost-effectiveness.

Ariane 5 ECA, Long March 2D,2C,3B/E and Atlas V 401 are next often used crafts.

LET'S TALK ABOUT ISRO

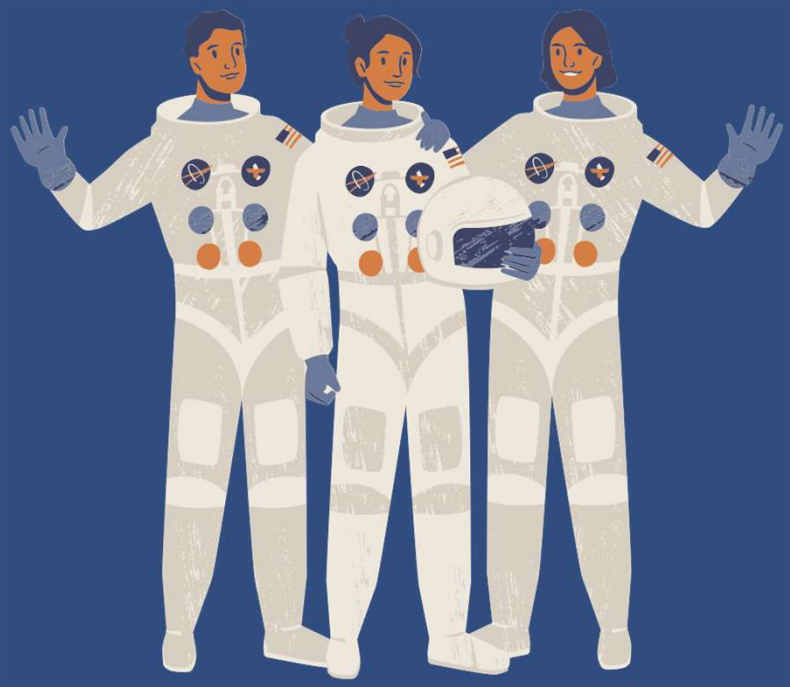
TOTAL MISSIONS LAUNCHED: 71

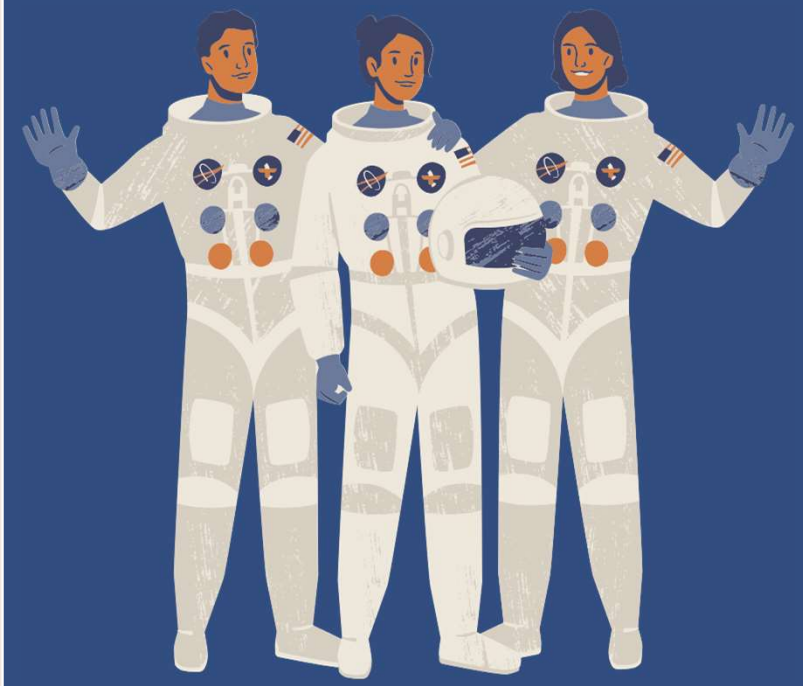
Successful missions=62
Partial Failure=3
Failed Missions=6

Success Rate=87.32%
Total Cost=$2.31bn

- Starting from a Failed Mission in 1993, ISRO has steadily increased its number of launches , especially since 2010, reflecting its growing capabilities and international demand for cost-effective satellite launches.

- Maximum successful missions are reported in 2016 and 2018.



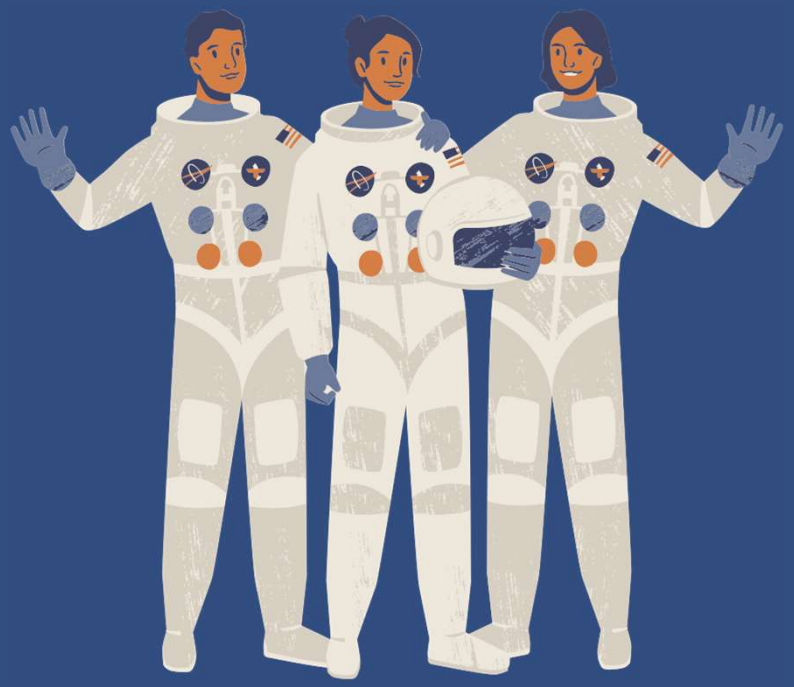


- In Second Launch Pad Satish Bhawan Space Centre 24 successful missions have been launched.
- With a mission success rate exceeding 90%, ISRO demonstrates impressive reliability in its missions, despite operating on significantly lower budgets compared to its global counterparts.

Key Rockets:

- **PSLV and GSLV:** Most frequently used rockets by ISRO.

- **Current Status: PSLV –XL launched in maximum missions and its CA series are still active but PSLV G is retired.**



KEY TAKEAWAYS

- **Rocket Launch Trends:** An increasing trend in rocket launches highlights the growing importance and activity in space missions, driven by private and public sector initiatives.
- **Mission Success Rates:** Mission success rates have improved significantly over time, reflecting technological advancements and better mission planning.
- **Launch Locations:** Traditional sites continue to be prominent, with new locations emerging, indicating broader geographic participation in space exploration.
- **ISRO's Contributions:** ISRO stands out for its cost-effective missions and growing role in the global space community.

STAKEHOLDERS

- ***Space Industry Professionals:*** Engineers, mission planners, and aerospace analysts analyzing trends and operational efficiencies.

- ***Business Executives and Investors:*** Evaluating strategic decisions and investment opportunities in the space sector.

- ***Government Agencies and Regulators:*** Overseeing compliance, safety, and national space policies (e.g., NASA, ESA, ISRO).

- ***Academic and Research Institutions:*** Researchers and students studying data for educational and innovation purposes.

STAKEHOLDERS

- ***Data Analysts and Scientists:*** Using Power BI reports for data analysis and extracting insights.

- ***Space Enthusiasts and General Public:*** Engaging with space exploration achievements and trends.

- ***Suppliers and Contractors:*** Identifying market trends and business opportunities in space technologies.

- ***International Collaborators:*** Partnering on missions and sharing expertise with global space agencies.

THANK YOU VERY MUCH!