**📊 Section: Insights from Space Mission Visualizations**

This section presents a visual data-driven analysis of various aspects of space missions, focusing on mission outcomes, costs, rocket status, and mission descriptions.

**1. Launch Price vs Mission Outcome**

A box plot was used to compare the launch prices across different mission outcomes:

* **Successful missions** span a wide range of launch costs, including several **very high-cost outliers** (above $5000 million). This indicates that both **low-budget and high-budget** missions can achieve success.
* **Failures, Prelaunch Failures, and Partial Failures** are mostly associated with **lower launch costs**, although Partial Failures show occasional high-cost missions that did not fully succeed.
* Overall, the plot suggests that **higher cost does not always equate to guaranteed mission success**.

**2. Rocket Status vs Mission Outcome**

A bar chart illustrated the relationship between a rocket’s operational status and its mission outcomes:

* **Retired rockets** account for the majority of both **successful and failed** missions, likely due to their longer historical usage.
* **Active rockets** show a **higher proportion of successful missions**, reflecting **technological advancements** and improved reliability in recent years.
* **Prelaunch failures are rare** among active rockets, indicating **stronger prelaunch testing and safeguards**.

**3. Word Cloud of Mission Descriptions**

A word cloud was generated from mission names and descriptions to identify frequently mentioned terms:

* Common terms include **“Cosmos,” “3M,” “11K65M,” “Molniya,” and “Voskhod,”** suggesting recurring usage of specific **rocket models or mission series**.
* The dominance of these terms reflects a strong historical presence of **Russian and Soviet-era launch vehicles** in the dataset.

**4. Cost Distribution by Mission Status**

A violin plot provided a deeper look into how launch costs are distributed within each mission status:

* **Success** has the most diverse cost spread, again showing that missions of all budgets can succeed.
* **Failure** and **Prelaunch Failure** missions are generally **clustered around lower budgets**, possibly indicating low-risk, less-funded missions.
* **Partial Failures** exhibit a moderate distribution, but still show that **substantial investments may not always lead to full success**.