***SpaceTrace*:** Exploratory Data Analysis of Space Data

Group 2

Why *SpaceTrace*?

- *'What lies beyond?'*
- Put forth fascinating insights and compelling stories from humanity's latest decades in space
- Learn about several facets of the history of human spaceflight across last 6 decades

What is money called in Space ??

EDA Objectives

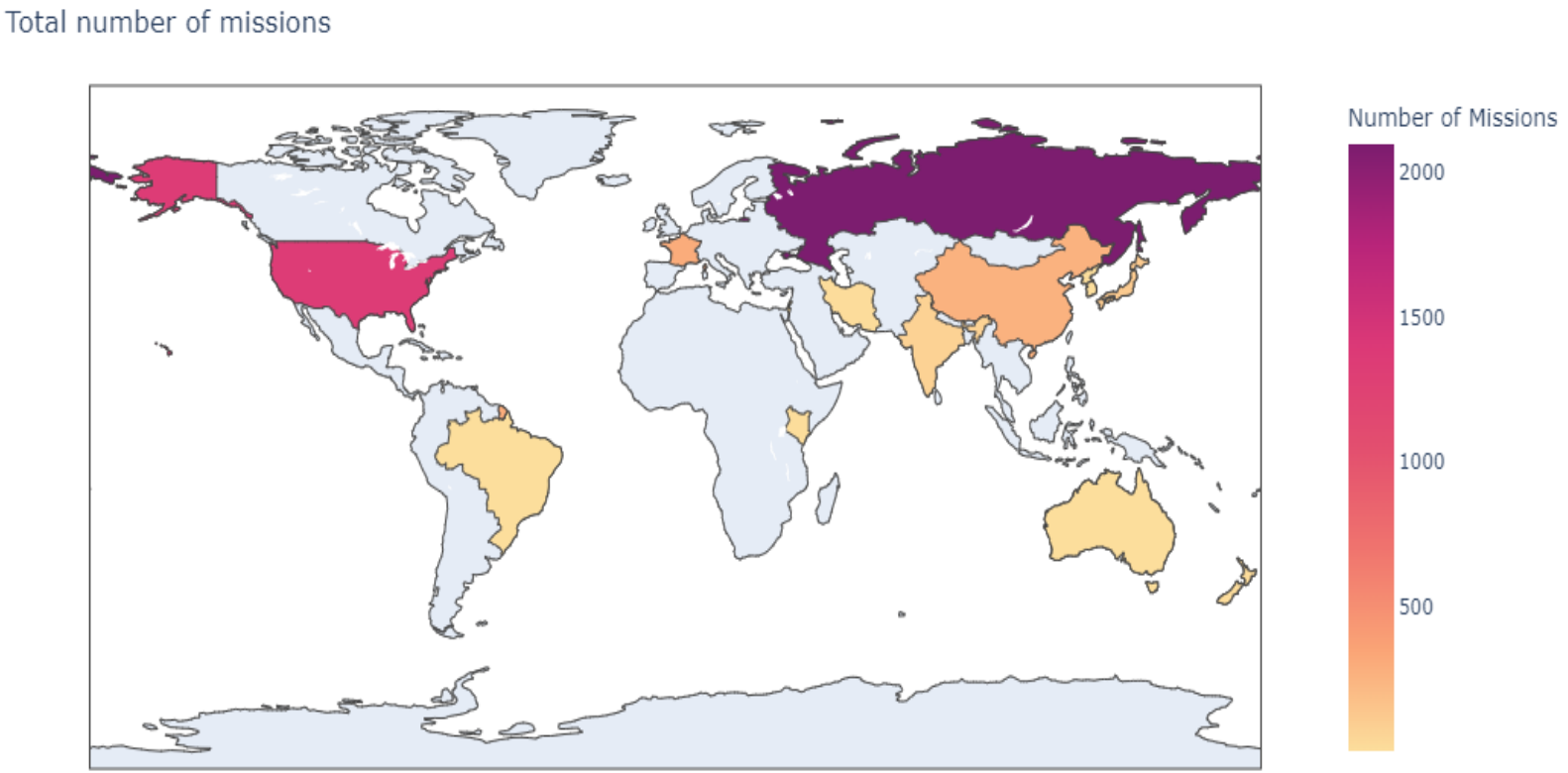
- Countries(and Companies) leading the Space Missions
- Interpreting the Space Race Era by Countries and Missions in Domination
- Analyzing the cost of missions
- Understanding Rocket Status
- Impact of the launch vehicle

About the Dataset

- Mission-level data scraped from https://nextspaceflight.com/launches/past/?page=1 and acquired in Kaggle
- ~4000 Space Missions from 1957-2020.
- 7 attributes:
  - Company
  - Location
  - Launch Date
  - Launch Vehicle & Name
  - Status of the Rocket
  - Cost(in Millions)
  - Status of the mission

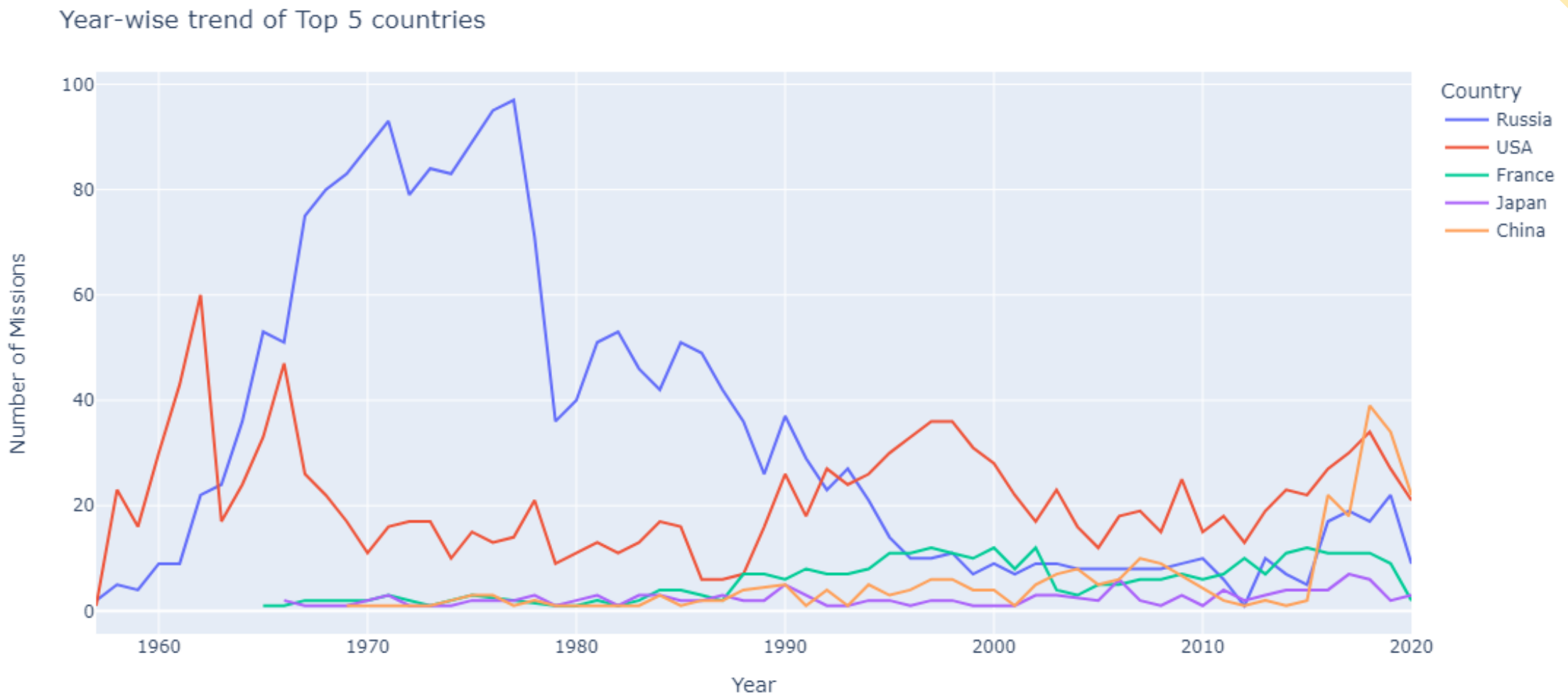
Data Cleaning and Preprocessing

- **Drop** some not-so-relevant **columns**.
- Type-cast and rename the columns.
- Split the columns : **Location, Date, and Detail**.
- Customize some of the entries in the split Detail Column.
- Fill empty values with NaN.



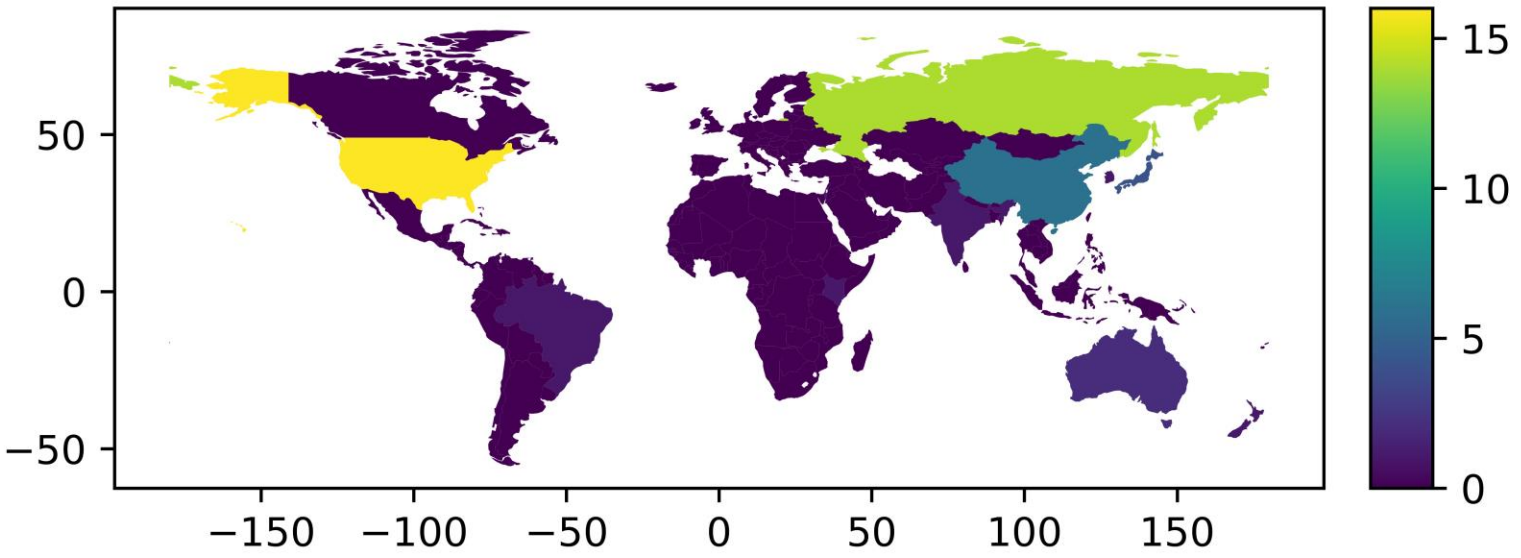
World map of Missions through 1957-2020

Yearly Trend Analysis

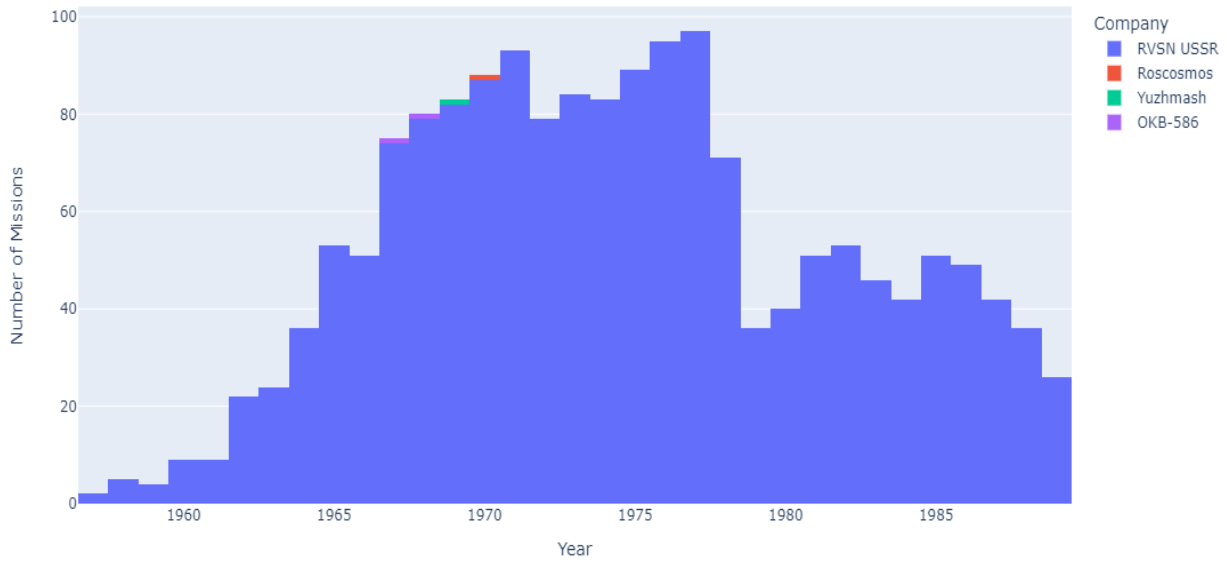


Company – Numbers in each Country

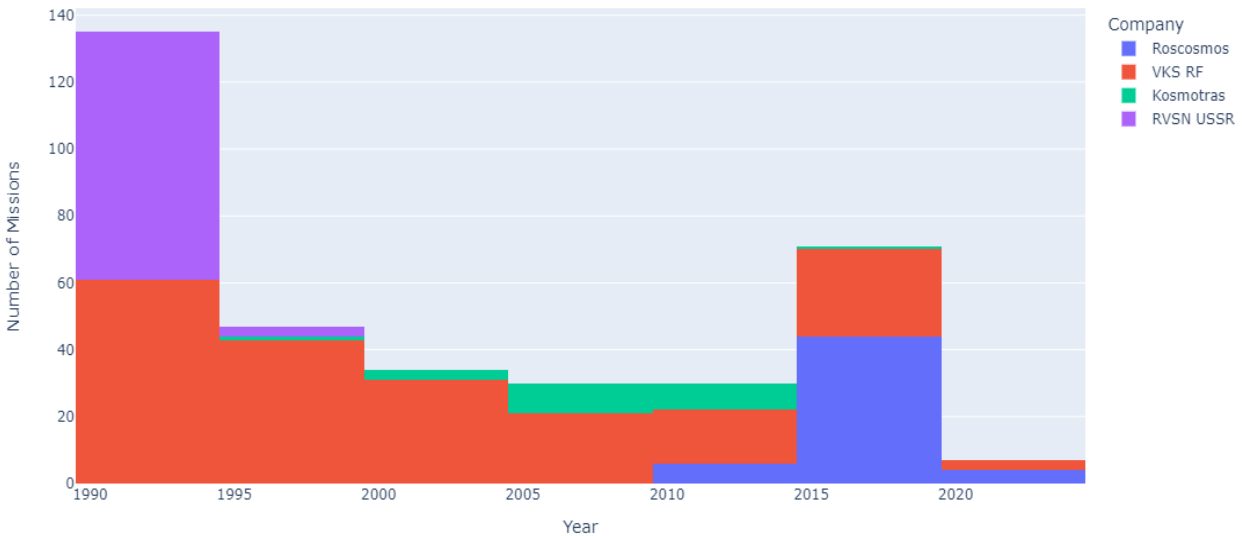
Number of companies by country



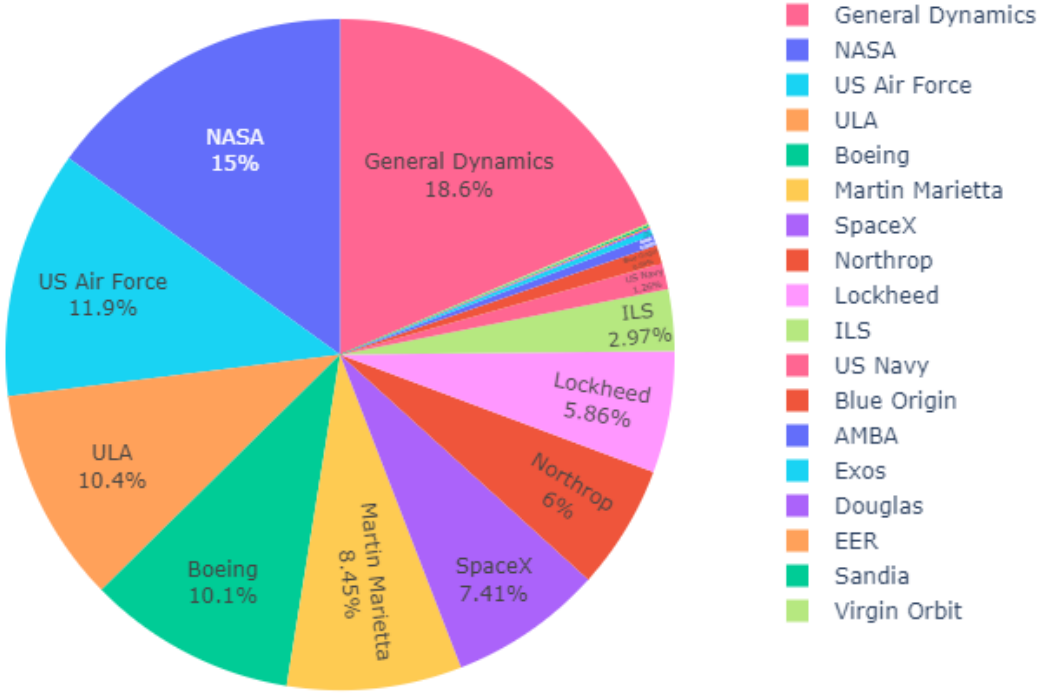
Russia Before 1990 : year-wise contribution of each company



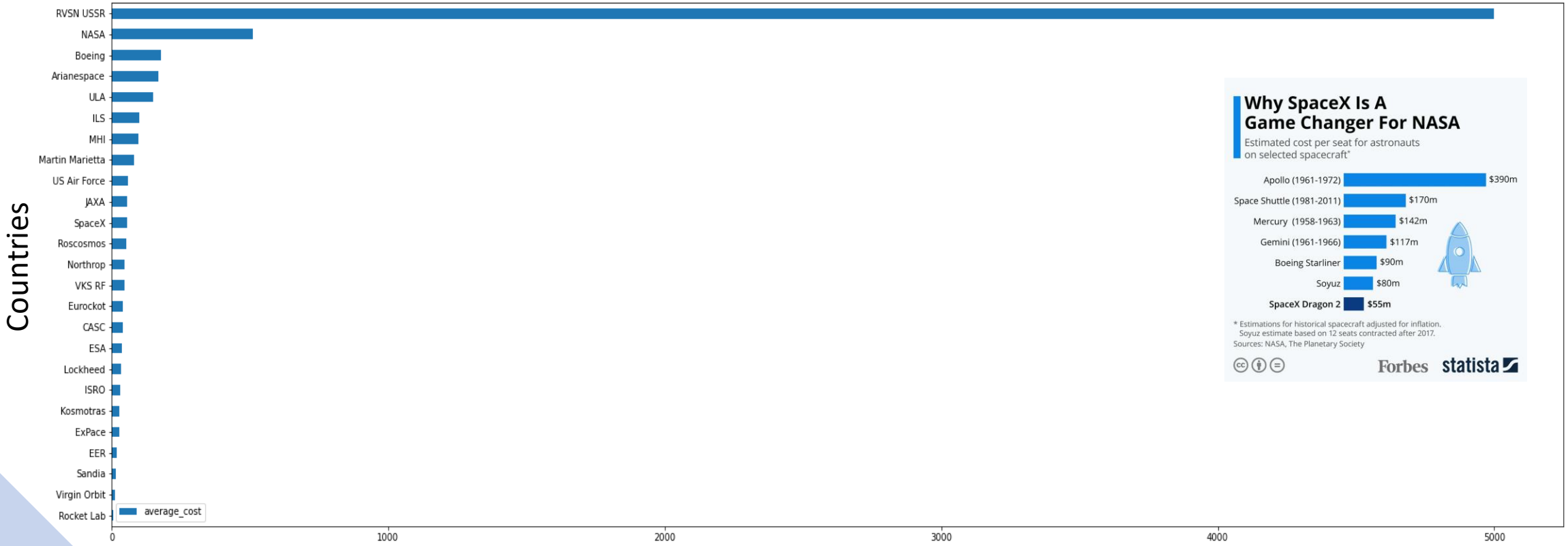
Russia After 1990 : year-wise contribution of each company



Contribution of companies in USA

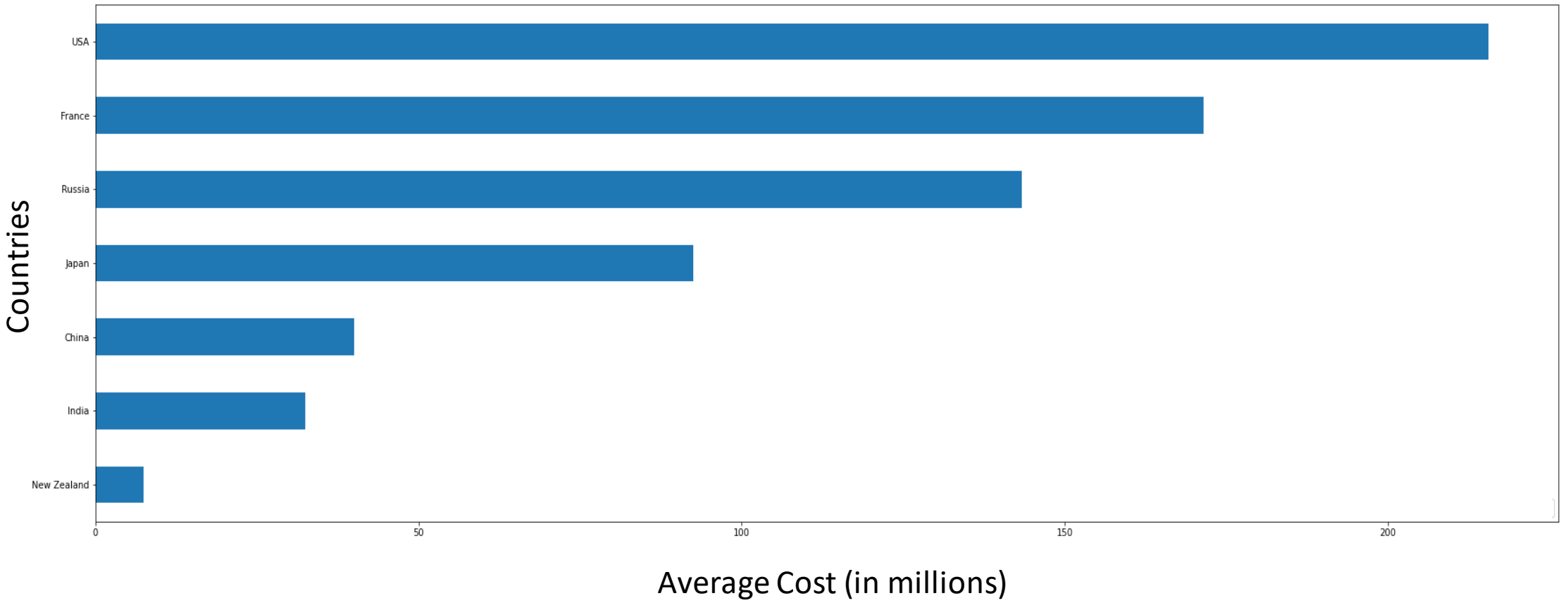


Company – average cost (in millions)

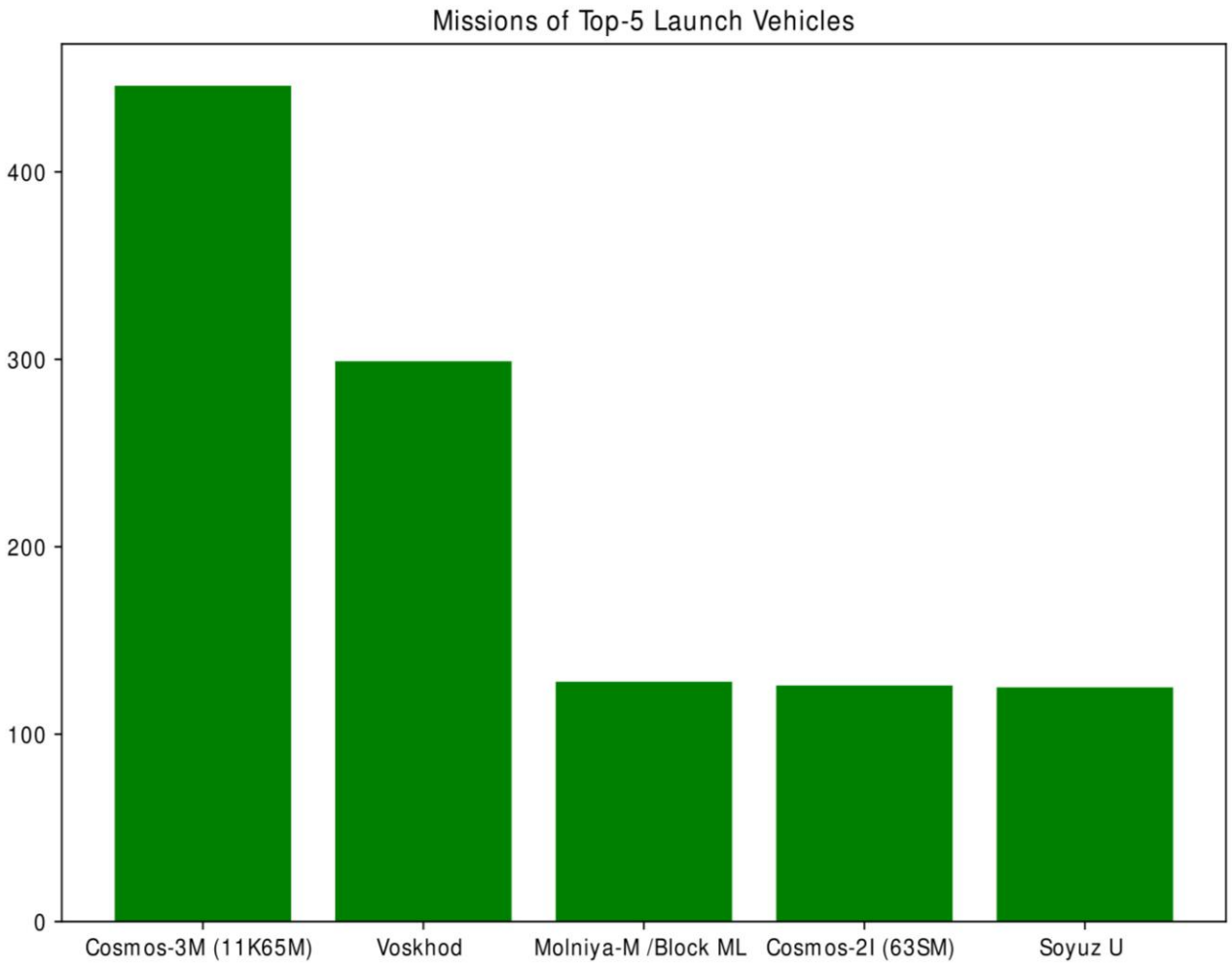


- Average Cost (in million)

Country – Average Cost Launch



Launch vehicle



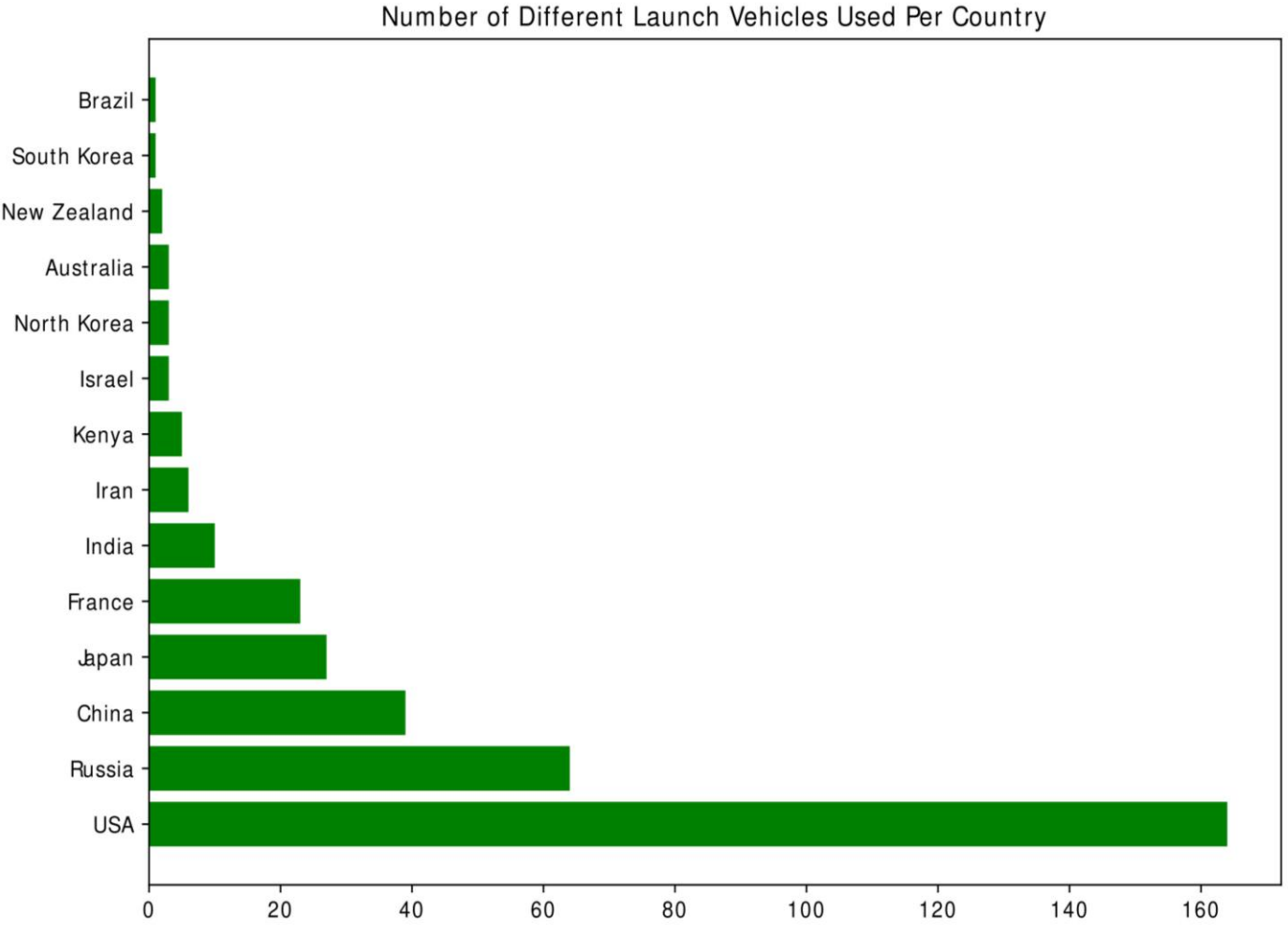
The five most heavily used Launch Vehicles are all Russian

This graph alone gives us a partial intuition that Russia has the most space missions to date.

In the world map we saw before, we saw that this is truly the case.

However, there's a slight twist to this.

Launch Vehicle (Continued)

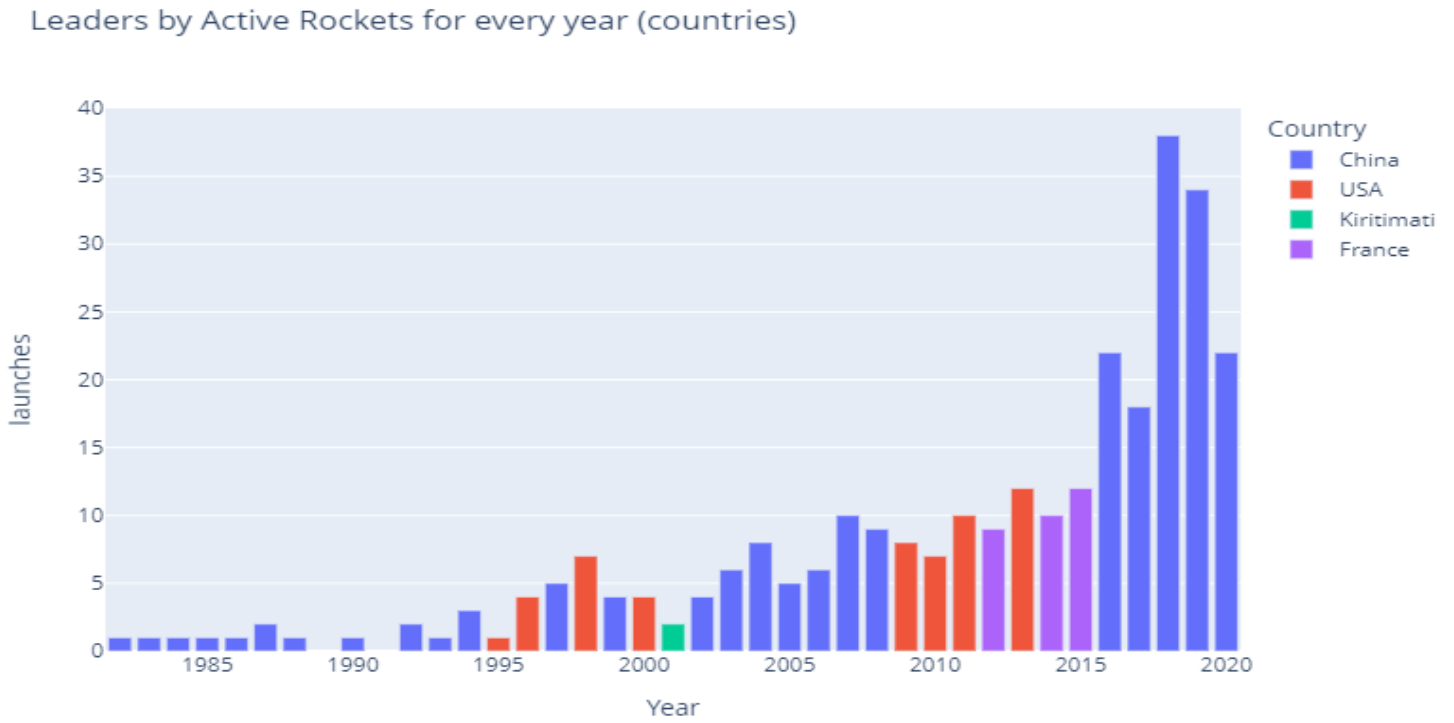


Here we see that US has maintained the most diversity when it comes to using Launch Vehicles.

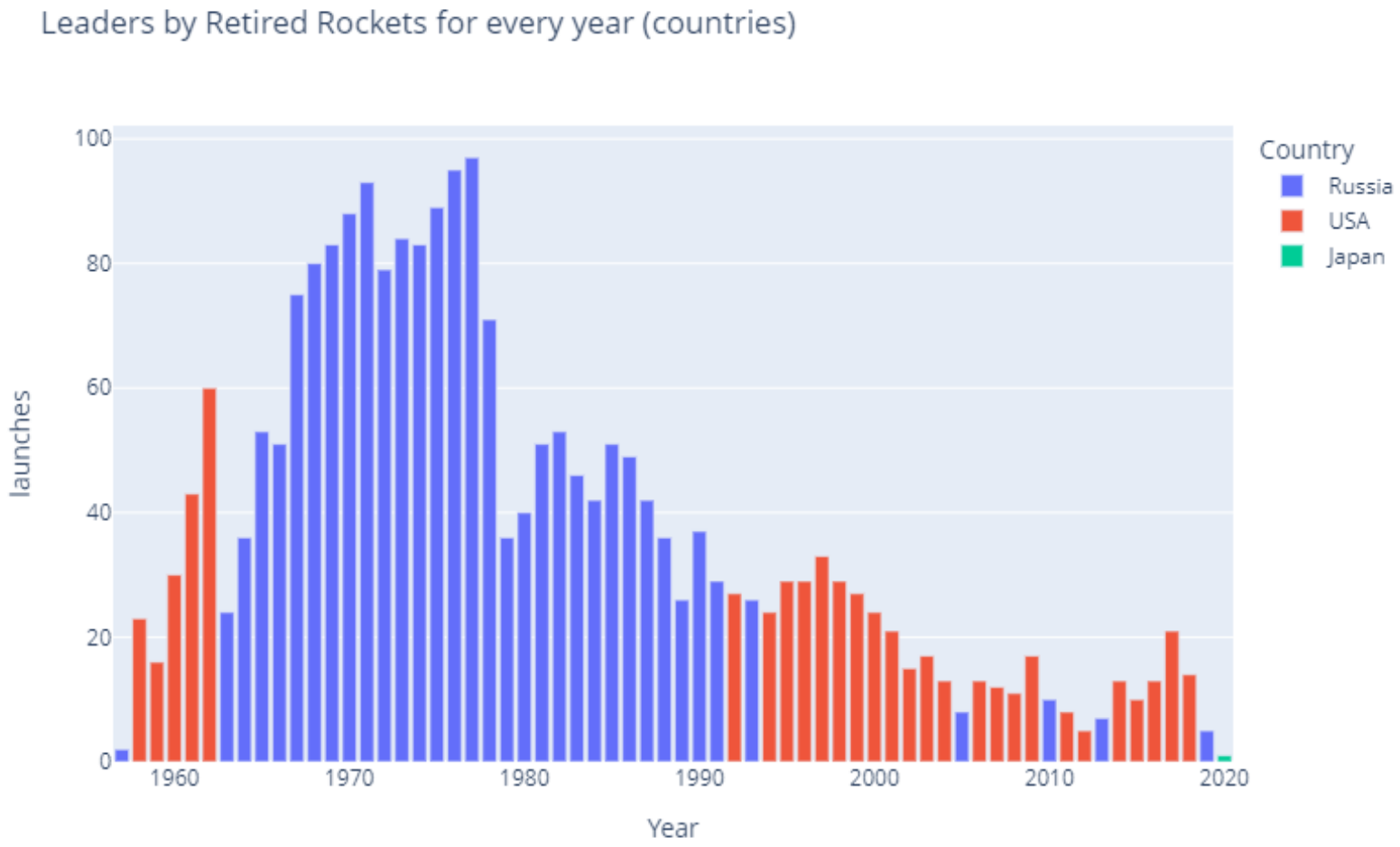
Even though, Russia has been involved in more space missions than US.

US less loyal to its Launch Vehicles compared to Russia ?

Rocket Status - Active

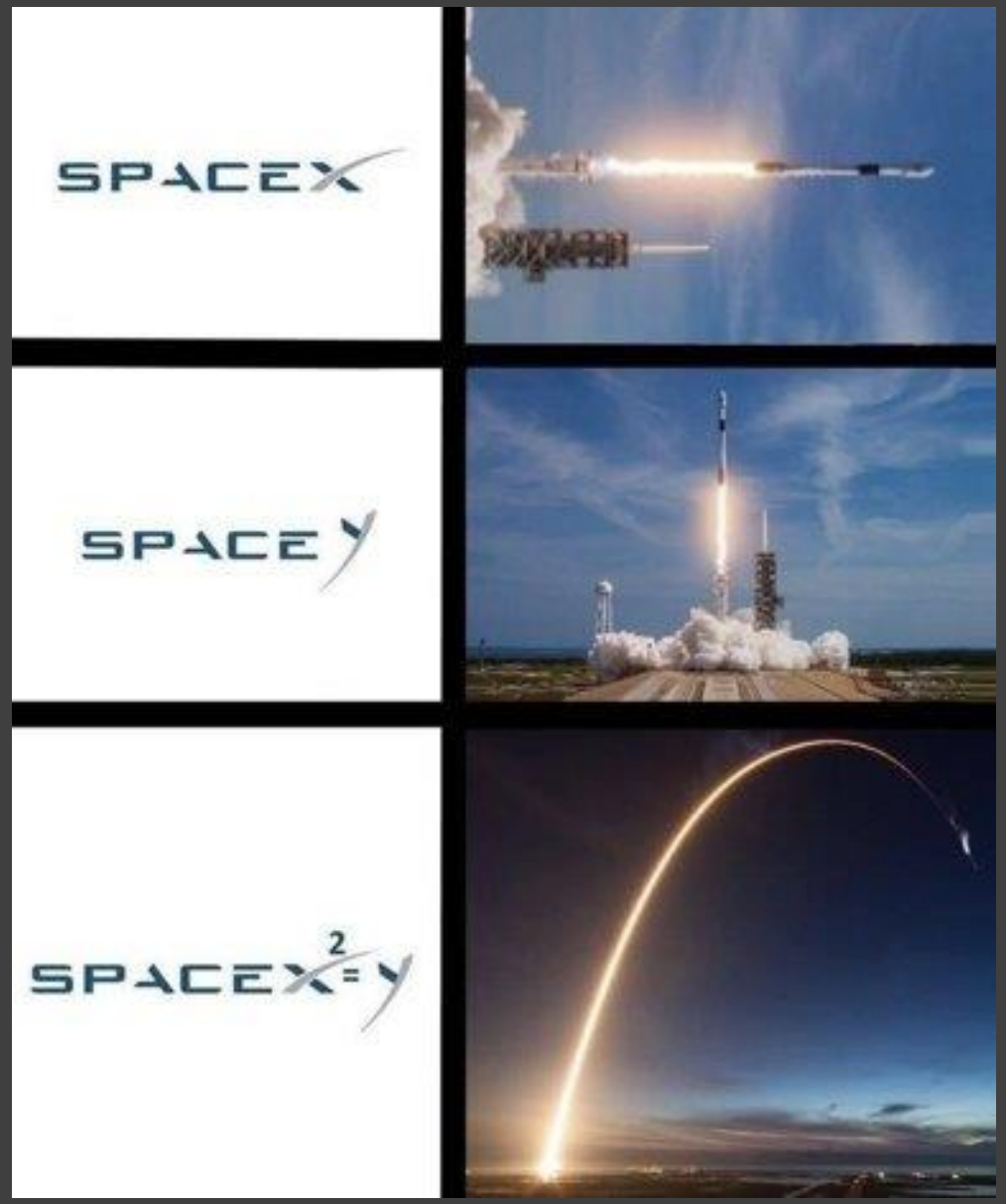


Rocket Status - Retired



Conclusion and Summary

- US and Russia - most dominating countries
- US – several companies investing in space tech, diverse Launch vehicles
- Russia – decline in the number of missions, maximum number of retired missions
- China – in the lead with maximum active rockets
- RVSN has the most expensive launch missions.
- New companies generally have low average launch cost.



Thank You


Any Questions?