

MISSION LAUNCH DATA CLEANING, ANALYSIS, AND VISUALIZATION USING POWER QUERY



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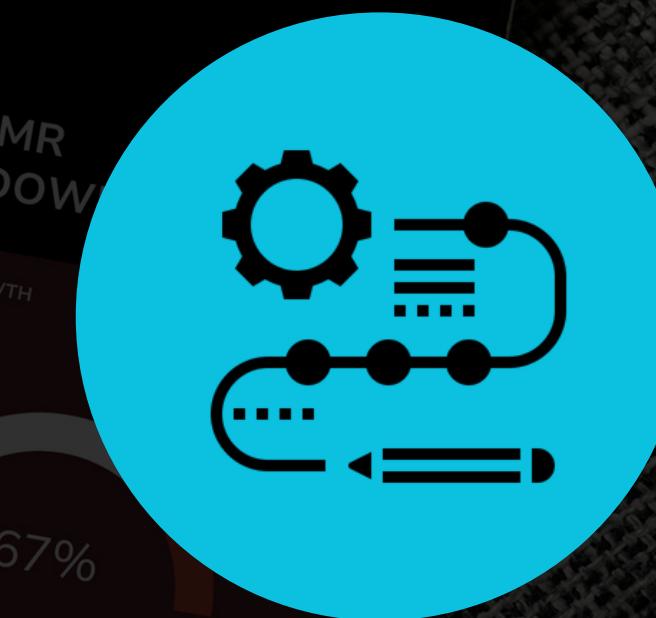
TOOLS AND LIBRARIES:
POWER QUERY & POWER BI

INTRODUCTION TO THE PROBLEM



GOAL

Mission Launch Data
Cleaning, Analysis, and
Visualization using
Power Query & Power BI



METHOD

- Null Cleanup
- Value Replacement
- Delete Columns
- Convert Data
- Simplify Columns
- Analyze Data
- Get Charts

TOOLS USED

DATA SOURCE: MISSION_LAUNCHES.CSV

- Excel: Data preparation (importing raw file, organizing columns, replacing missing values using averages by total).
 - Power Query: Data cleaning (removing nulls, filtering erroneous rows, ensuring consistency).
 - Power BI: Visualization and analysis of the cleaned dataset.

DATA EXPLORATION AND STRUCTURE

READING HISTORICAL DATA:

Historical launch data is loaded, the dataset contains:

- Index
- Organization
- Location
- Date
- Detail
- Rocket Status
- Price
- Mission Status

There are empty fields in many columns, so we'll search for matches to fill in missing values.

CHECK FOR NULL VALUES

Null values were detected within the price column, so it will be replaced by the median price

A	B	C	D	E	F	G	H
Index	Organization	Location	Date	Detail	Rocket_Status	Price	Mission_Status
0	SpaceX	LC-39A, Kennedy Space Center	Fri Aug 07, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
1	CASC	Site 9401 (Xichang Satellite Launch Center)	Thu Aug 06, 2021	Long March 2D	StatusActive	29.75	Success
2	SpaceX	Pad A, Boca Chica	Tue Aug 04, 2021	Starship Prototype	StatusActive		Success
3	Roscosmos	Site 200/39	Thu Jul 30, 2021	Proton-M/I	StatusActive	65.0	Success
4	ULA	SLC-41, Cape Canaveral	Thu Jul 30, 2021	Atlas V 541	StatusActive	145.0	Success
5	CASC	LC-9, Taiyuan	Sat Jul 25, 2021	Long March 2C	StatusActive	64.68	Success
6	Roscosmos	Site 31/6, Baikonur	Thu Jul 23, 2021	Soyuz 2.1a	StatusActive	48.5	Success
7	CASC	LC-101, Wenchang	Thu Jul 23, 2021	Long March 2B	StatusActive		Success
8	SpaceX	SLC-40, California	Mon Jul 20, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
9	JAXA	LA-Y1, Tanegashima	Sun Jul 19, 2021	H-IIA 202	StatusActive	90.0	Success
10	Northrop Grumman	LP-0B, Wallops Island	Wed Jul 15, 2021	Minotaur IV	StatusActive	46.0	Success
11	ExPace	Site 95, Jiuquan	Fri Jul 10, 2021	Kuaizhou 1	StatusActive	28.3	Failure
12	CASC	LC-3, Xichang	Thu Jul 09, 2021	Long March 2D	StatusActive	29.15	Success
13	IAI	Pad 1, Palymer	Mon Jul 06, 2021	Shavit-2	StatusActive		Success
14	CASC	Site 9401 (Xichang)	Sat Jul 04, 2021	Long March 2C	StatusActive	29.75	Success
15	Rocket Lab	Rocket Lab	Sat Jul 04, 2021	Electron/C	StatusActive	7.5	Failure
16	CASC	LC-9, Taiyuan	Fri Jul 03, 2021	Long March 2B	StatusActive	64.68	Success
17	SpaceX	SLC-40, California	Tue Jun 30, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
18	CASC	LC-2, Xichang	Tue Jun 23, 2021	Long March 2B	StatusActive	29.15	Success
19	CASC	Site 9401 (Xichang)	Wed Jun 16, 2021	Long March 2C	StatusActive	29.75	Success
20	SpaceX	SLC-40, California	Sat Jun 13, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
21	Rocket Lab	Rocket Lab	Sat Jun 13, 2021	Electron/C	StatusActive	7.5	Success
22	CASC	LC-9, Taiyuan	Wed Jun 10, 2021	Long March 2B	StatusActive	30.8	Success
23	SpaceX	SLC-40, California	Thu Jun 04, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
24	CASC	Site 9401 (Xichang)	Sun May 31, 2021	Long March 2C	StatusActive	29.75	Success
25	SpaceX	LC-39A, Kennedy	Sat May 30, 2021	Falcon 9 Block 5	StatusActive	50.0	Success
26	CASC	Xichang Satellite Launch Center	Fri May 29, 2021	Long March 2B	StatusActive	5.3	Success

Missions Dashboard

Archivo Home Transform Add Column View Tools Help

Conditional Column Merge Columns ABC Trigonometry Statistics Standard Scientific Information Date Time Duration Text Analytics Vision Azure Machine Learning

Column From Examples Custom Invoke Custom Function Duplicate Column Format From Text From Number From Date & Time AI Insights

Queries [2]

= Table.ReorderColumns(#"Removed Columns1", {"Index", "Organization", "Location", "Merged", "Detail", "Rocket_Status", "Price", "Count"}, {1, 2, 3})

mission_launches1

mission_launches

Index	Organization	Location	Merged	Detail	Count
1	SpaceX	LC-39A, Kennedy Space Center, Florida, United States	07/08/2020	Falcon 9 Block 5 Starlink V1 L9 & BlackSky	1000 distinct, 1000 unique
2	CASC	Site 9401 (SLS-2), Jiuquan Satellite Launch Center, China	06/08/2020	Long March 2D Gaofen-9 04 & Q-SAT	38 distinct, 9 unique
3	SpaceX	Pad A, Boca Chica, Texas, United States	04/08/2020	Starship Prototype 150 Meter Hop	79 distinct, 14 unique
4	Roscosmos	Site 200/39, Baikonur Cosmodrome, Kazakhstan	30/07/2020	Proton-M/Briz-M Ekspress-80 & Ekspress-103	914 distinct, 834 unique
5	ULA	SLC-41, Cape Canaveral AFS, Florida, United States	30/07/2020	Atlas V 541 Perseverance	996 distinct, 993 unique
6	CASC	LC-9, Taiyuan Satellite Launch Center, China	25/07/2020	Long March 4B Ziyuan-3 03, Apocalypse-10 & NJU-H	1000 distinct, 1000 unique
7	Roscosmos	Site 31/6, Baikonur Cosmodrome, Kazakhstan	23/07/2020	Soyuz 2.1a Progress MS-15	1000 distinct, 1000 unique
8	CASC	LC-101, Wenchang Satellite Launch Center, China	23/07/2020	Long March 5 Tianwen-1	1000 distinct, 1000 unique
9	SpaceX	SLC-40, Cape Canaveral AFS, Florida, United States	20/07/2020	Falcon 9 Block 5 ANASIS-II	1000 distinct, 1000 unique
10	JAXA	LA-Y1, Tanegashima Space Center, Japan	19/07/2020	H-IIA 202 Hope Mars Mission	1000 distinct, 1000 unique
11	Northrop	LP-0B, Wallops Flight Facility, Virginia, United States	15/07/2020	Minotaur IV NROL-129	1000 distinct, 1000 unique

Query Settings

PROPERTIES

Name: mission_launches

All Properties

APPLIED STEPS

- Source
- Navigation
- Promoted Headers
- Changed Type
- Inserted Merged Column
- Removed Columns
- Reordered Columns
- Renamed Columns
- Inserted Merged Column1
- Changed Type1
- Removed Columns1
- Reordered Columns1

REPLACING NULL VALUES IN THE PRICE COLUMN

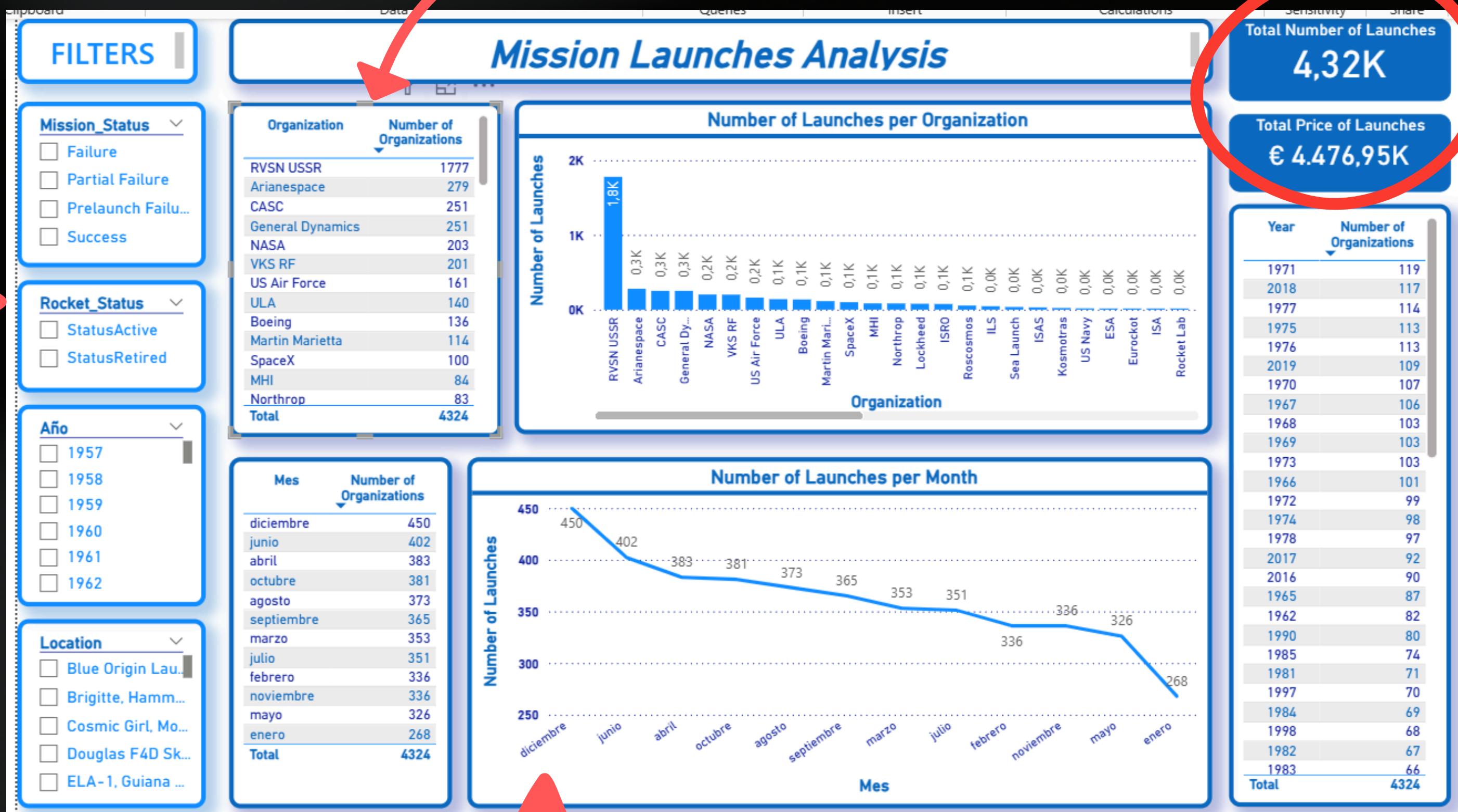
The median price per launch in the data was taken and used to replace the null values with that value, which is 850 euros, to allow for further price analysis.

The columns were converted to the corresponding data type, such as the date column and the currency price column.



DATA ANALYSIS

INSIGHTS THE DASHBOARD PROVIDES:



The filters section allows you to customize the view based on your needs. You'll find it on each dashboard sheet.

Which are the most popular months for launches?

Taking into account the sum of all launches conducted over the years, the top 3 months are: December with 450, June with 402, and April with 383 launches.

How many launches were made per year?

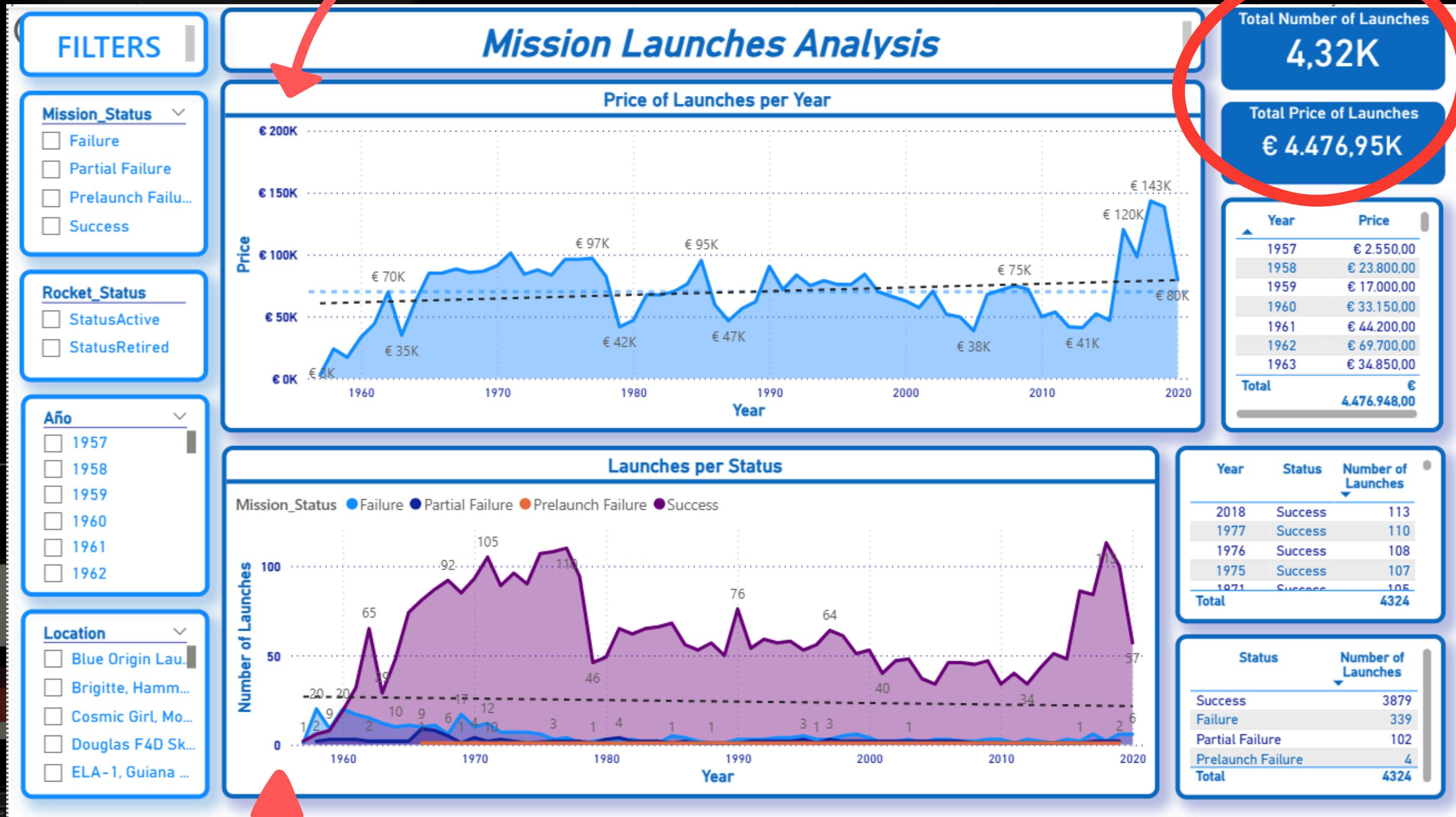
From 1957 to 2020, the table on the left shows the number of launches per year, with 1971 standing out as the peak year (119 launches)

DATA ANALYSIS

INSIGHTS THE DASHBOARD PROVIDES:

How has the cost per mission changed over time?

The cost of launches has shown an upward trend over the years (black dotted line), rising from €2,550 in 1957 to €143,000 in 2018, representing an increase of 5.508%.



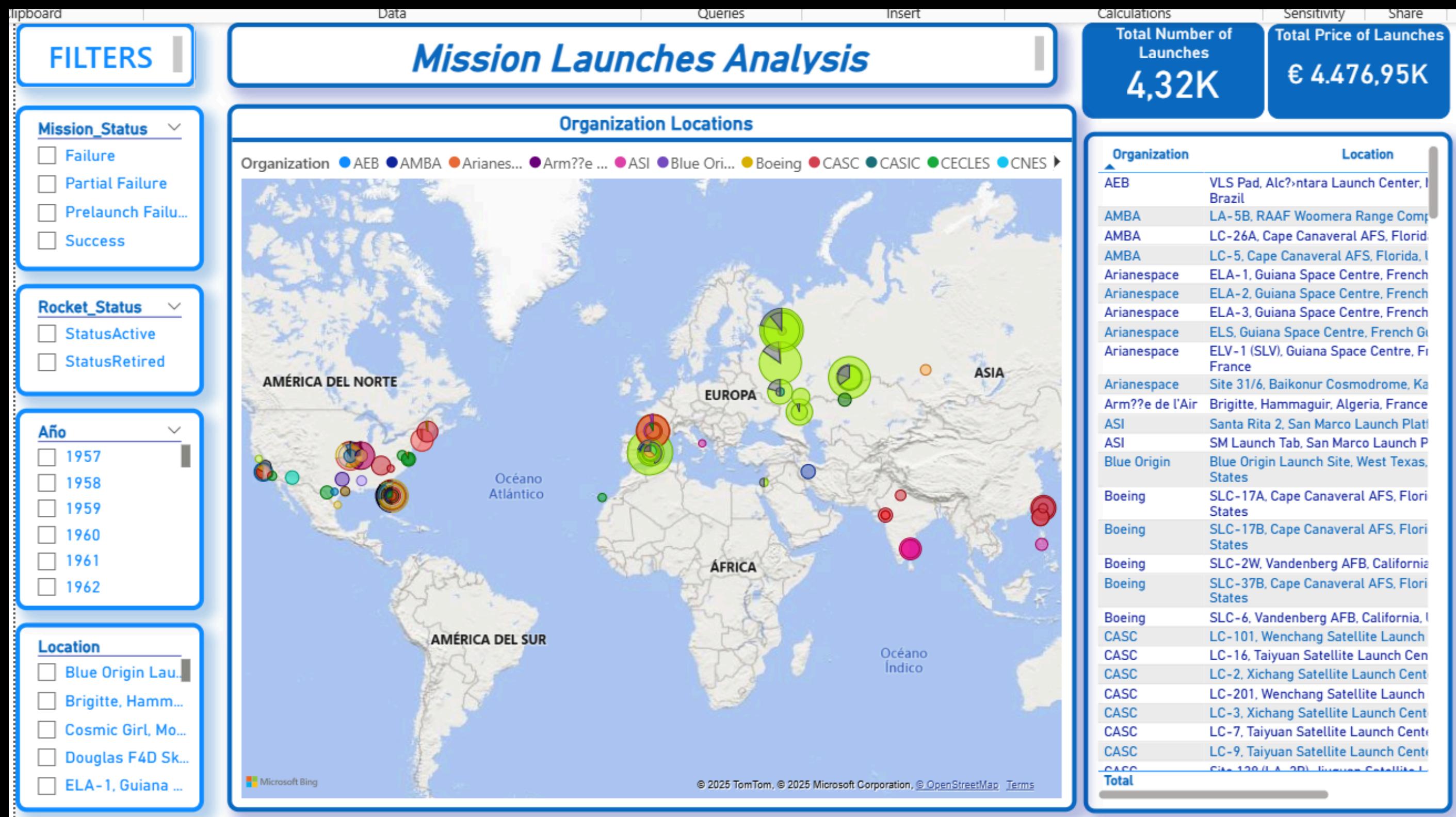
The vast majority of launches have been successful: nearly 90% achieved their mission. Failures account for about 8%, partial failures for 2%, and prelaunch failures are negligible (0.1%). Overall, this highlights a very high reliability rate in space launches.

Have launches become safer over the years?

Although the absolute number of successful launches peaked in the 1960s–70s and later declined due to fewer launches overall, the proportion of failures (total, partial, or prelaunch) has consistently decreased and remained very low in recent decades. This indicates that launches have become more reliable and safer over time, even if the total volume of launches has fluctuated.

DATA ANALYSIS

INSIGHTS THE DASHBOARD PROVIDES:



Within this sheet you can see all the addresses of the different organizations that exist around the world with their exact address, city, state, and country.

GROUND

THE INDUSTRY'S HISTORY

I WANT TO SAY

THANK YOU

FOR YOUR ATTENTION

40
30
20

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