Insights into Zipline's flight data

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Individual outlier launches

The below 4 flights number 17136, 17437, 17438 and 17439 have outlier launches in the sense they moved in North-West direction, which is opposite to all others which have moved in South-East direction.

| fname	seconds_since_launch	pos_rel_north	pos_rel_east	pos_rel_down
data/flight_17136.csv	4.998460	172.113411	-33.888538	-33.568627
data/flight_17437.csv	4.998490	169.189642	-34.388001	-32.992665
data/flight_17438.csv	4.998482	166.911160	-32.642692	-31.761213
data/flight_17439.csv	4.998476	167.055280	-33.323919	-32.500906

```
newdf=df1.diff()
```

Poorly performing parts

Flight id 17705 has a preflight voltage of 31.544811, which is 0.600854 less than 32.145665(mean) of the preflight voltages.The battery serial number of this flight is 15SPJJJ10060032 and this looks like a poorly performing part.
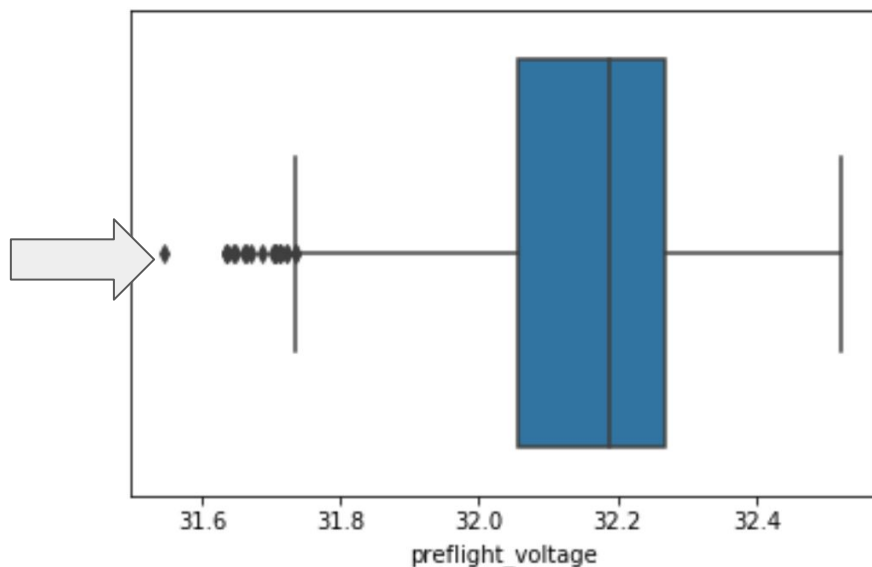
# Correlation matrix for atmospheric factors during launch
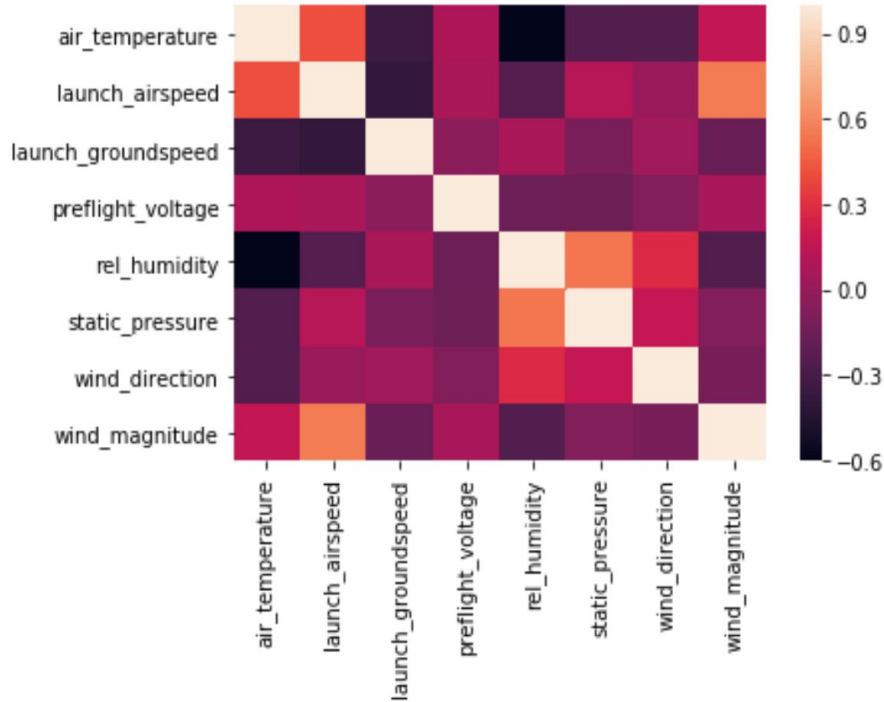
- This correlation matrix shows a positive correlation between:
  1. wind magnitude and launch airspeed.
  2. air temperature and launch airspeed.
  3. Relative humidity and static pressure.

- Also, there is a negative correlation between:
  1. Air temperature and Relative humidity.
  2. Launch ground speed and launch air speed.
  3. Relative humidity and air temperature

Factors affecting launch airspeed
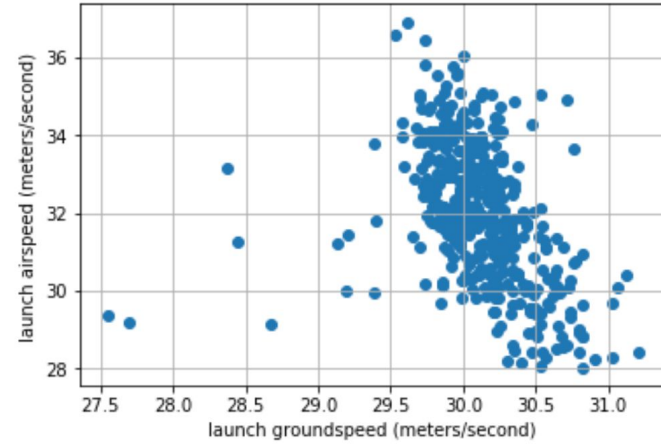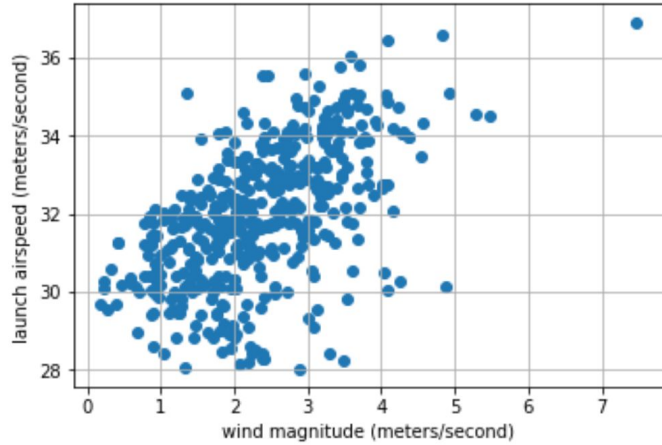
Launch airspeed is positively correlated to wind magnitude while it is negatively correlated to launch ground speed as shown in the figures above.
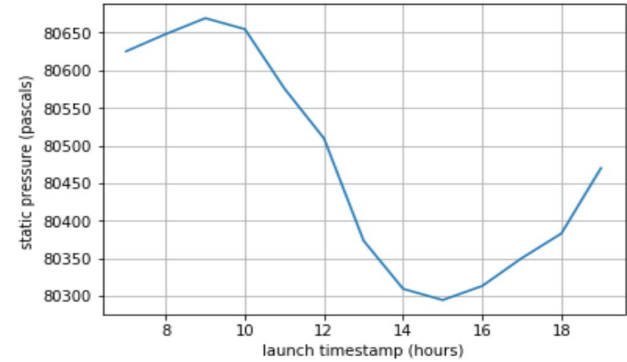
Diurnal weather patterns
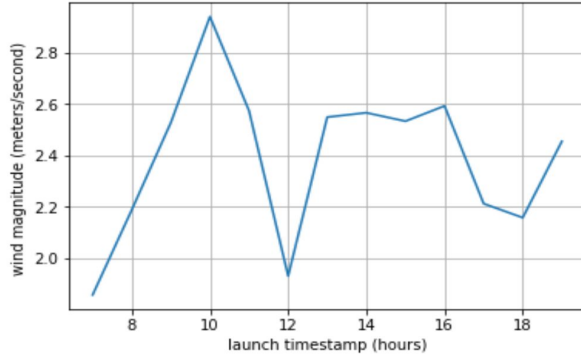
On an average Wind magnitude in this area rises from early morning till 10 am and then starts to fall till 12 pm after which it again rises and falls as shown in the figure.
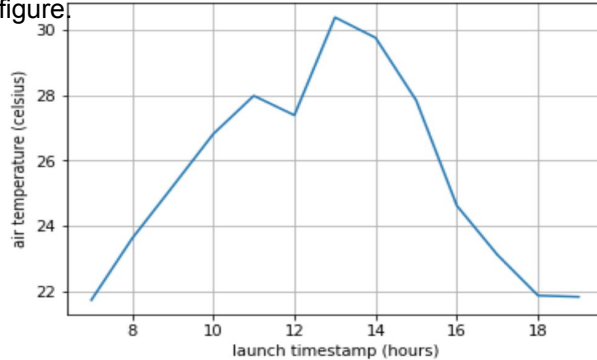
On an average Air temperature in this region rises till around 1 pm in the afternoon and then keeps falling.

On an average Static pressure in this region falls till around 3 pm and the then increases.
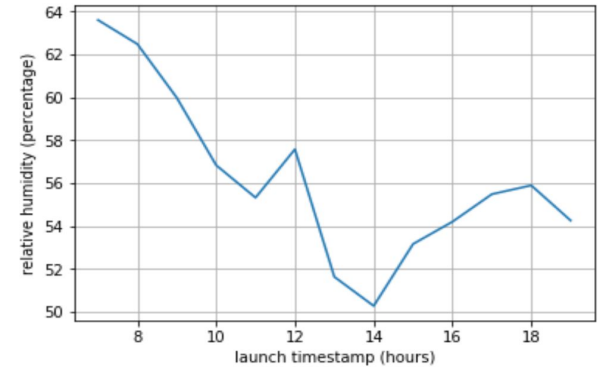

On an average relative humidity in this region falls till 2 ppm and then starts to rise.

Actionable insights

- From the graphs in the previous two slides, it can be inferred that launch air speed of a zip is directly proportional to wind speed and the wind speed on an average is maximum at around 10 am in the morning. This would be a good time for launching a zip.
- As the humidity goes up, the air pressure for a given volume of air goes down. This means the wings have fewer air molecules to affect as they are pushed through the air mass. Fewer molecules = less lift. From the graphs in the previous two slides, we can see that relative humidity is maximum during early morning and falls as the day passes. So it's better to avoid early morning flights.

Correlation matrix for flight takeoff details
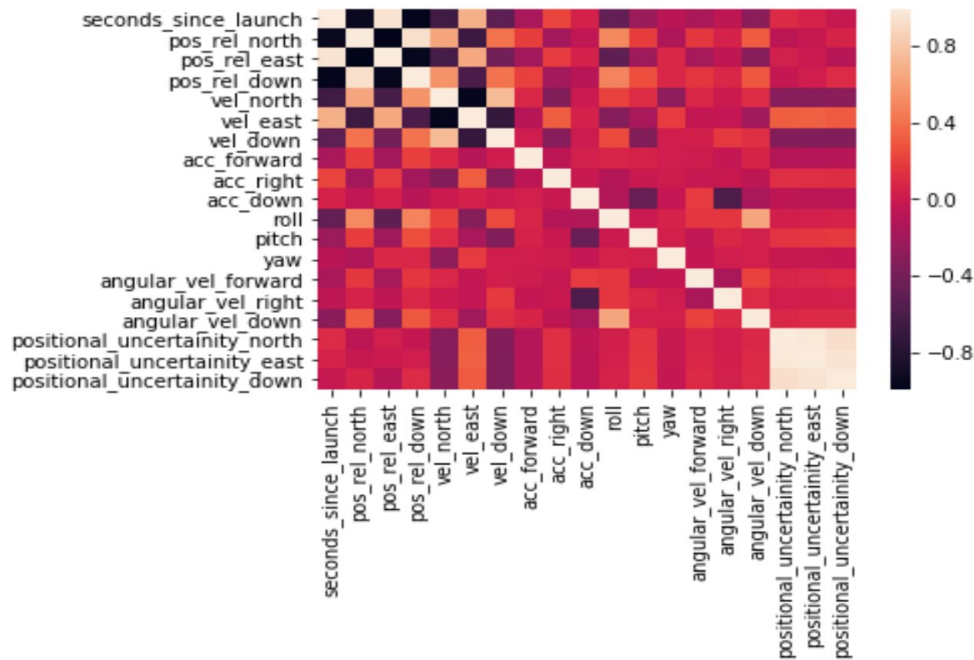
This correlation matrix shows that there is a negative correlation between:

1. Seconds since launch and position/velocity/acceleration relative to North, which means that the airplanes are moving towards South.

And there is a positive correlation between all other fields

Corrupted or missing data points

These 16 flights have missing data

for preflight voltage.

Flight number	Pre-flight voltage
16951	NaN
16952	NaN
16954	NaN
16955	NaN
16957	NaN
16959	NaN
16960	NaN
16961	NaN
16962	NaN
16965	NaN
16967	NaN
16980	NaN
16983	NaN
16984	NaN
16986	NaN
16988	NaN