worldwar2

September 16, 2024

[1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

[3]:
```
# Step 2: Load the dataset, handle mixed types and missing values
df = pd.read_csv('operations.csv', low_memory=False)
```

[5]:
```
# Step 3: Data Cleaning
# Convert 'Mission Date' to datetime
df['Mission Date'] = pd.to_datetime(df['Mission Date'], errors='coerce')
```

[7]:
```
# Convert 'Target Latitude', 'Target Longitude', 'Altitude' to float
cols_to_convert = ['Target Latitude', 'Target Longitude', 'Altitude (Hundreds␣
 ↪of Feet)', 'High Explosives Weight (Tons)',
                   'Aircraft Returned', 'Aircraft Damaged', 'Aircraft Lost']
df[cols_to_convert] = df[cols_to_convert].apply(pd.to_numeric, errors='coerce')
```

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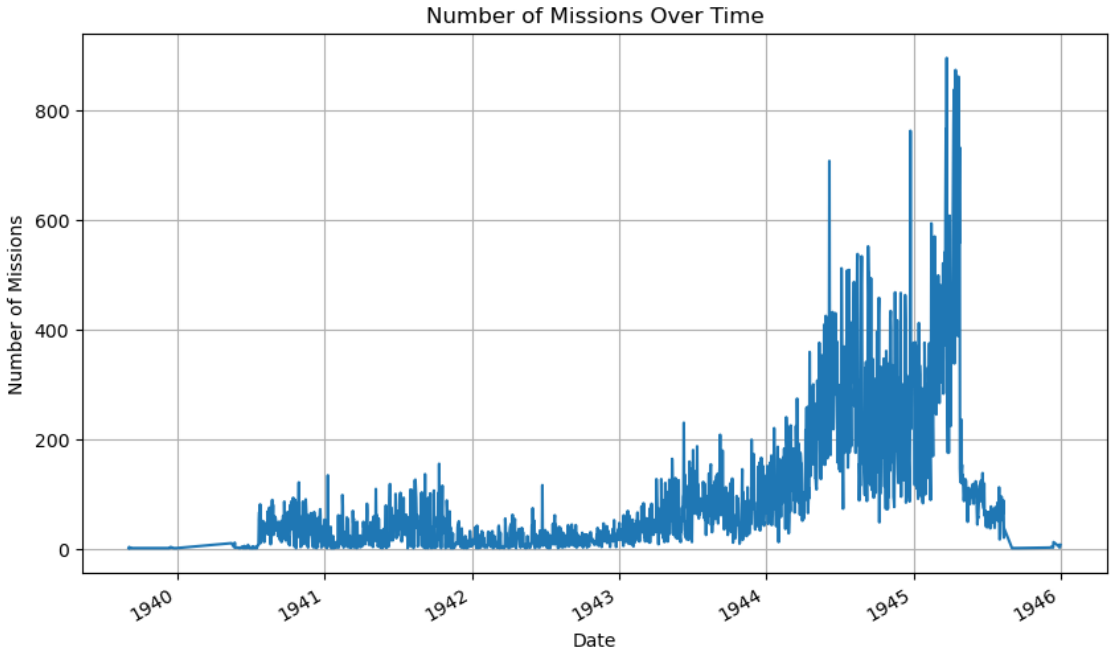
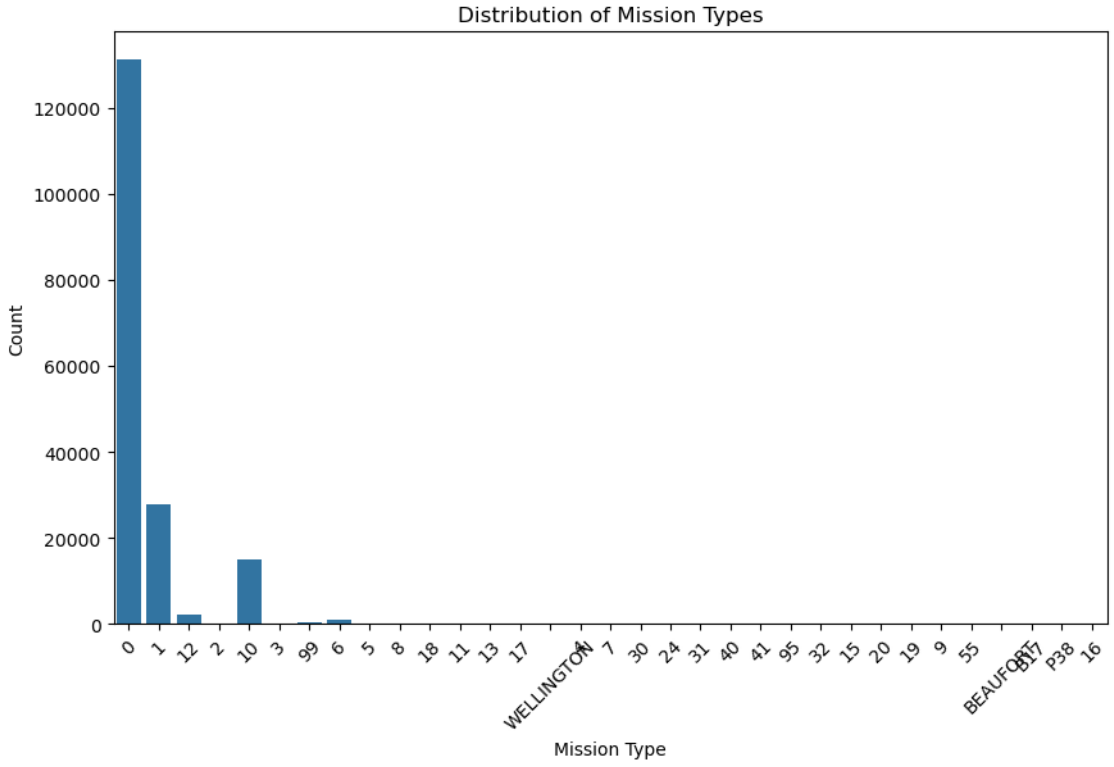
```
# Handle missing values: Fill NaNs with 0 for numerical columns
df.fillna(0, inplace=True)
```

[11]:
```
# Step 4: Visualizing key columns
# 4.1. Mission count over time
plt.figure(figsize=(10,6))
df['Mission Date'].value_counts().sort_index().plot()
plt.title('Number of Missions Over Time')
plt.xlabel('Date')
plt.ylabel('Number of Missions')
plt.grid(True)
plt.show()
```

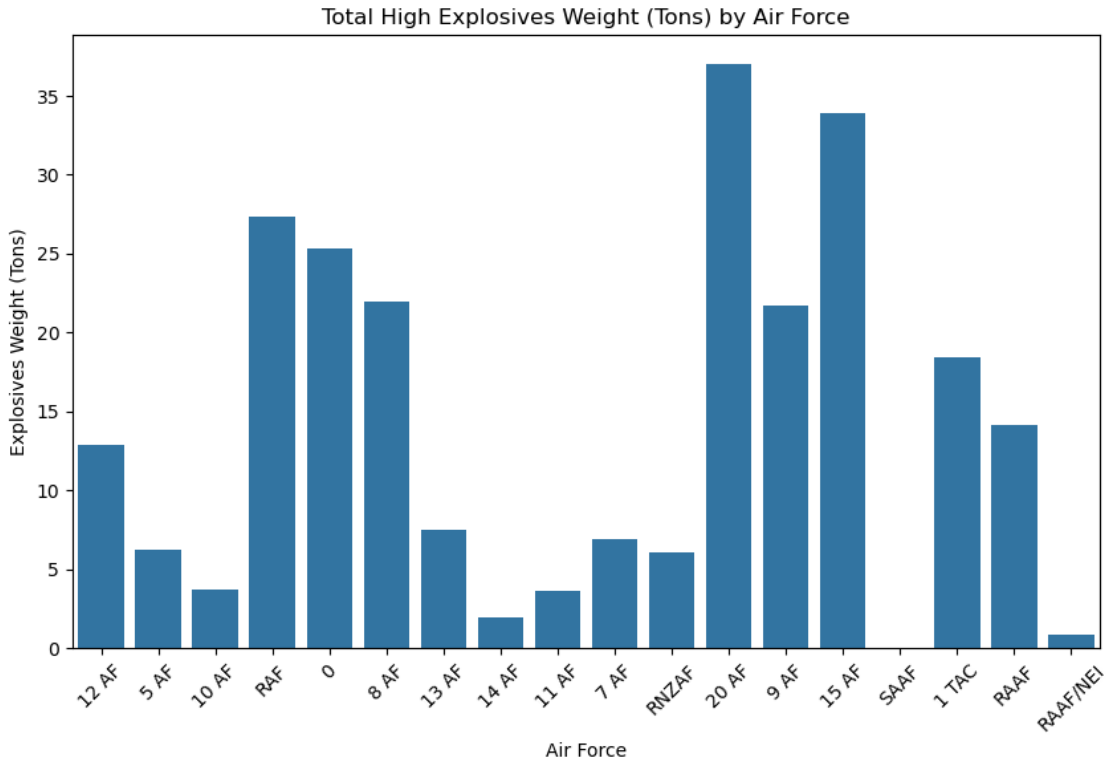


[13]:
```
# 4.2. Mission types distribution
plt.figure(figsize=(10,6))
sns.countplot(data=df, x='Mission Type')
plt.title('Distribution of Mission Types')
plt.xlabel('Mission Type')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()
```

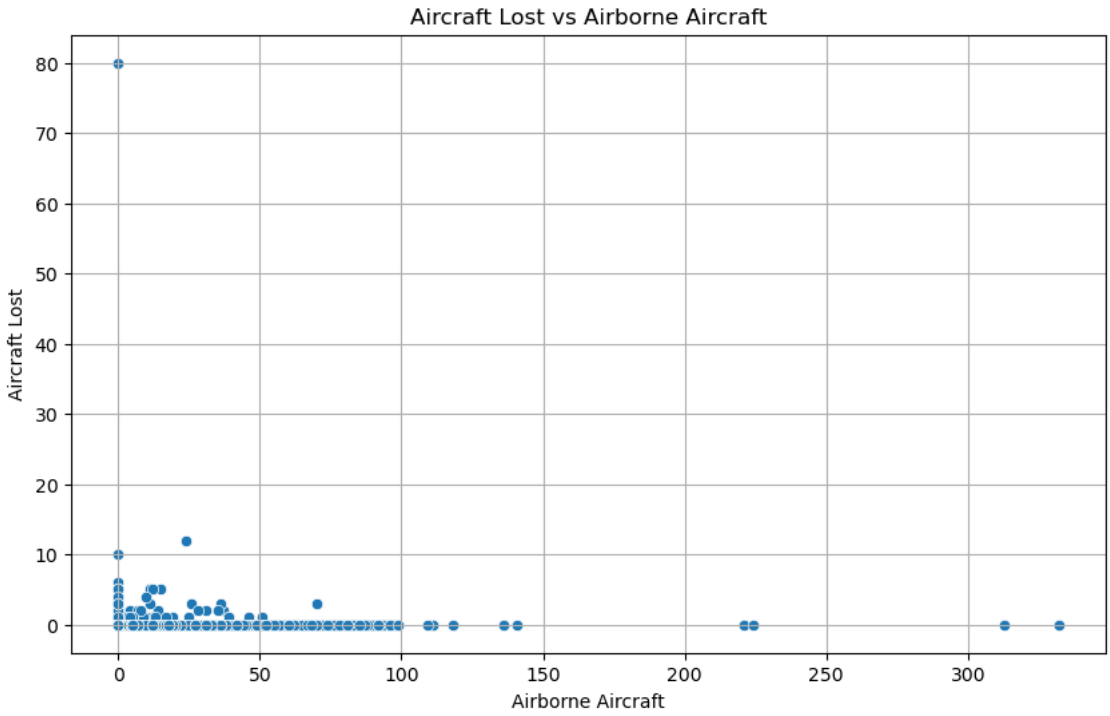


[15]:
```
# 4.3. High Explosive Payload by Air Force
plt.figure(figsize=(10,6))
sns.barplot(data=df, x='Air Force', y='High Explosives Weight (Tons)', ci=None)
plt.title('Total High Explosives Weight (Tons) by Air Force')
plt.xlabel('Air Force')
plt.ylabel('Explosives Weight (Tons)')
plt.xticks(rotation=45)
plt.show()
```

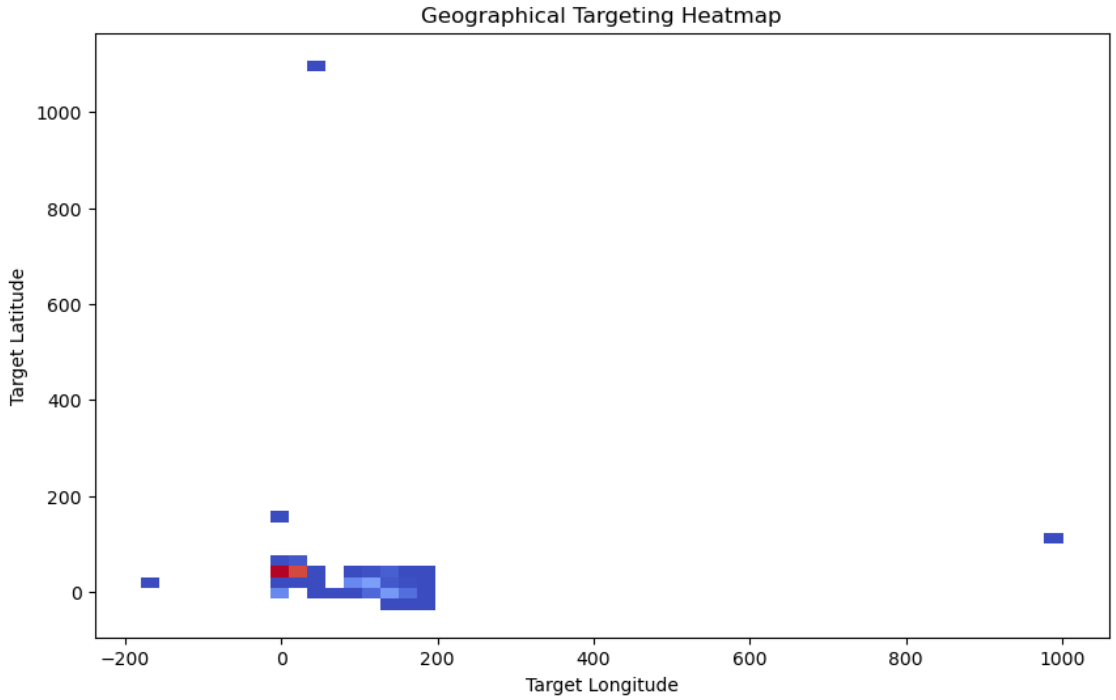
```
C:\Users\Rajveer\AppData\Local\Temp\ipykernel_3904\3961556559.py:3:
FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effect.

  sns.barplot(data=df, x='Air Force', y='High Explosives Weight (Tons)',
ci=None)
```



[17]:
```
# 4.4. Aircraft lost vs Airborne Aircraft
plt.figure(figsize=(10,6))
sns.scatterplot(data=df, x='Airborne Aircraft', y='Aircraft Lost')
plt.title('Aircraft Lost vs Airborne Aircraft')
plt.xlabel('Airborne Aircraft')
plt.ylabel('Aircraft Lost')
plt.grid(True)
plt.show()
```



[19]:
```
# 4.5. Heatmap for geographical targeting (Target Latitude vs Target Longitude)
plt.figure(figsize=(10,6))
sns.histplot(data=df, x='Target Longitude', y='Target Latitude', bins=50,␣
 ↪pmax=0.9, cmap='coolwarm')
plt.title('Geographical Targeting Heatmap')
plt.xlabel('Target Longitude')
plt.ylabel('Target Latitude')
plt.show()
```



[21]:
```
# Step 5: Insights
# - Total number of missions executed
total_missions = df['Mission ID'].nunique()
print(f"Total number of missions: {total_missions}")
```

```
Total number of missions: 178281
```

[23]:
```
# - Total number of aircraft lost
total_aircraft_lost = df['Aircraft Lost'].sum()
print(f"Total number of aircraft lost: {total_aircraft_lost}")
```

```
Total number of aircraft lost: 360.121936
```

[25]:
```
# - Total tonnage of explosives dropped
total_explosives_weight = df['High Explosives Weight (Tons)'].sum()
print(f"Total tonnage of explosives dropped: {total_explosives_weight:.2f}␣
 ↪tons")
```

```
Total tonnage of explosives dropped: 3495957.65 tons
```

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