

# LASER ATTACKS ON AIRCRAFT

**An analysis of 2014 Data on Laser Attacks on Aircraft in  
the USA to Identify Trends and Increase Safety**

James Brambley – June 2020

[james.brambley@gmail.com](mailto:james.brambley@gmail.com)

# HISTORY

- Since the 1990s Laser Attacks on Aircraft have been increasing steadily.
- Can affect pilot vision during take off and landing.
- Some mitigation measures are possible but difficult longer term.
- If it's possible to predict where they might happen then pilots can prepare and brief themselves accordingly.

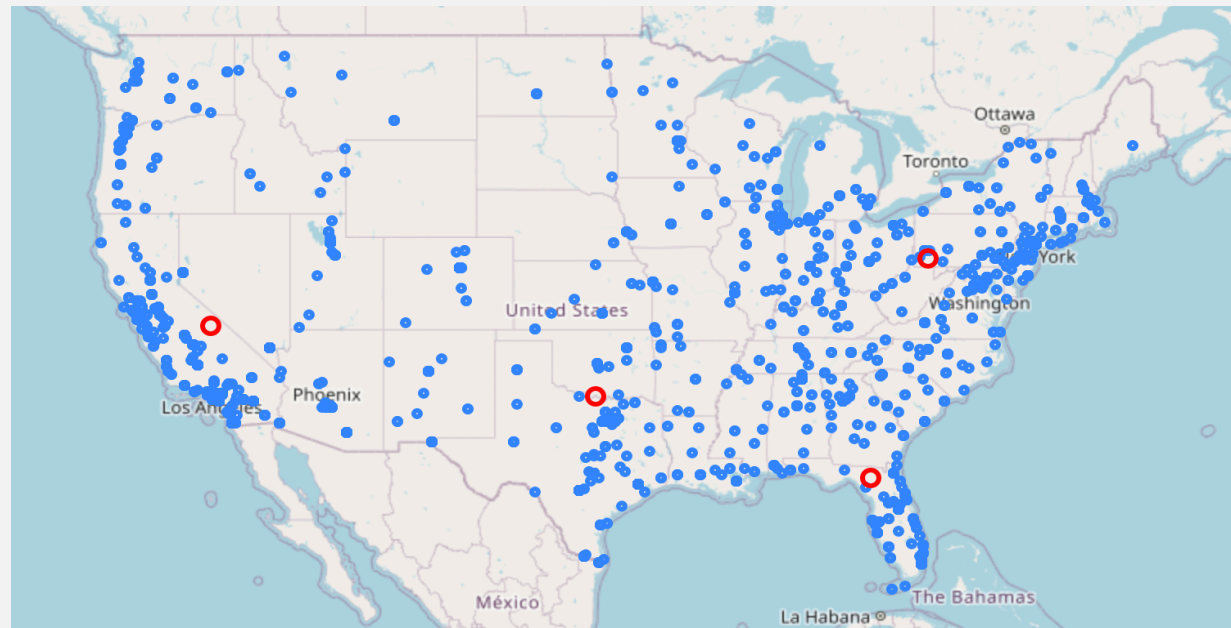
# DATA

- Federal Aviation Administration published 2014 Data.

DATE	TIME	Aircraft ID	No. A/C	TYPE A/C	ALT	MAJOR CITY	COLOR	Injury Reported	CITY	STATE
2014-01-01	0:08	CHQ6045	1	E145	8000	CAE	Green	NO	Columbia	South Carolina
2014-01-01	0:35	PSA	1	CRJ2	2100	PHL	Green	NO	Philadelphia	Pennsylvania
2014-01-01	2:02	SWA563	1	B737	4200	PHX	Green	NO	Phoenix	Arizona
2014-01-01	2:35	RPA3242	1	E175	FL240	EWR	Green	NO	Newark	New Jersey
2014-01-01	2:59	AAL1153	1	B738	12000	POM	Green	NO	Pomona	California
2014-01-01	3:00	AWE1954	1	A321	2000	LGA	UNKN	NO	New York	New York
2014-01-01	3:02	SWA549	1	B737	FL260	SBA	Green	NO	Santa Barbara	California
2014-01-01	3:07	SKW2617	1	CRJ2	4000	SMO	Green	NO	Santa Monica	California

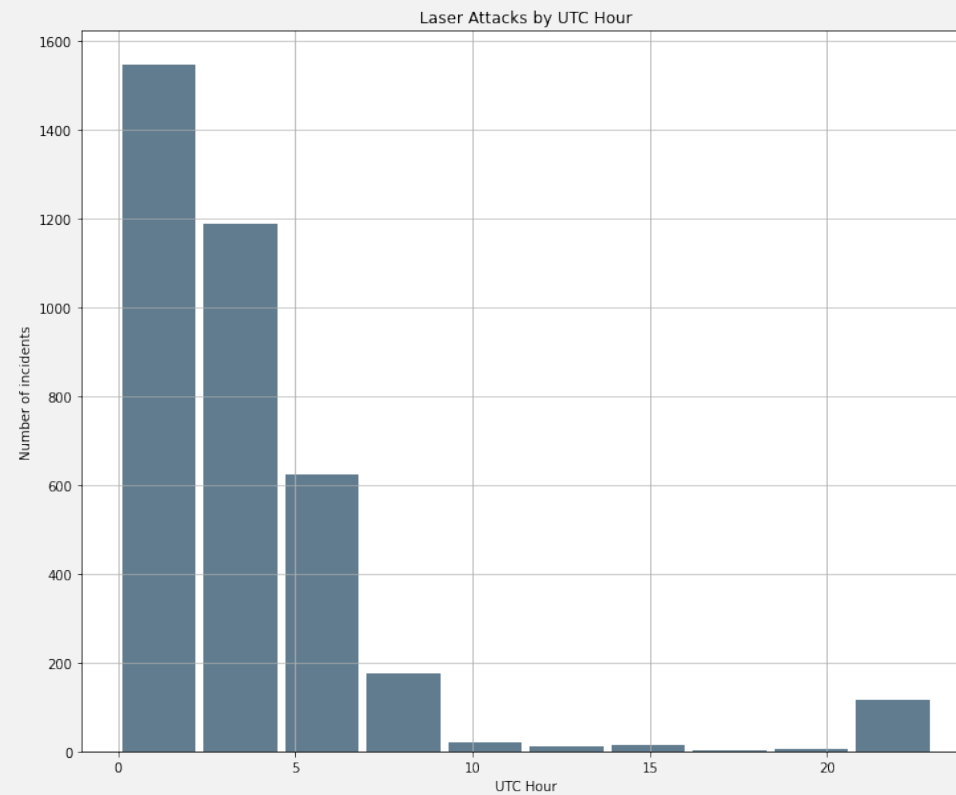
# LOCATIONS

Attack Locations with 4 K-Means Clusters

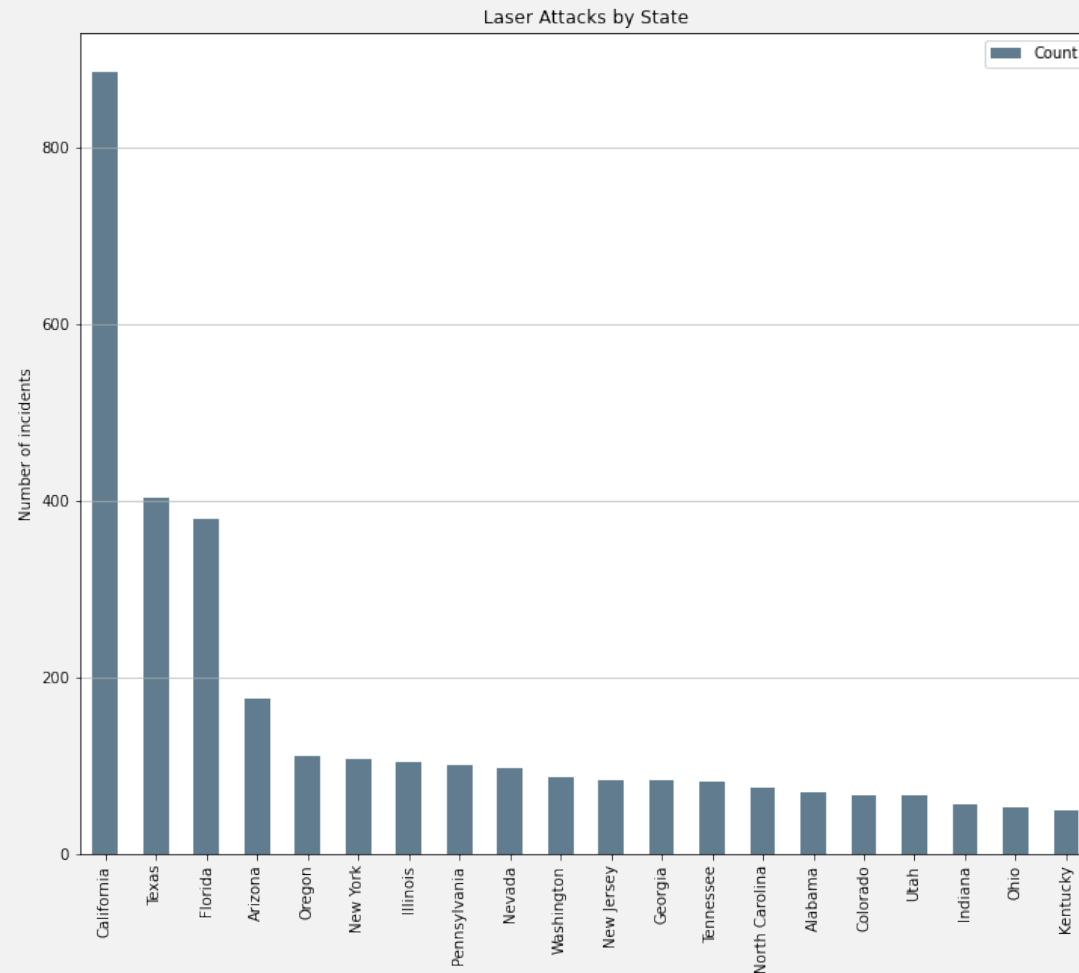


# TIME OF DAY

00:00 to 05:00 UTC by far the most vulnerable time



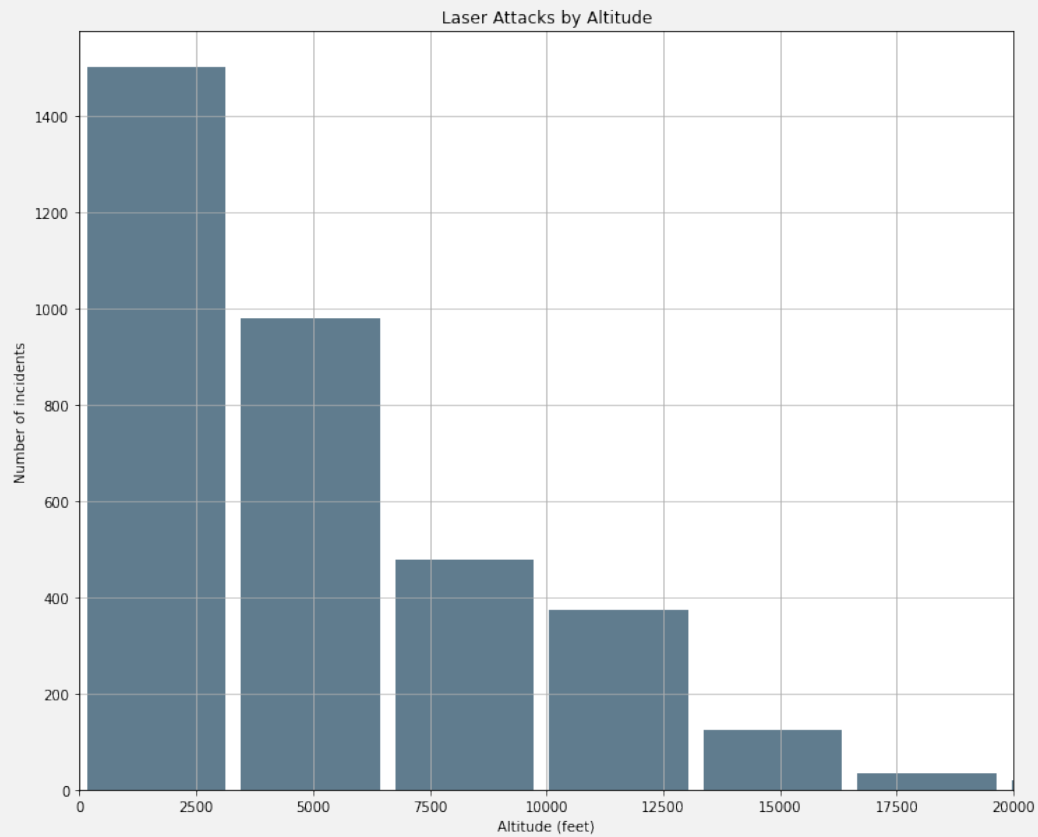
## BY STATE



California has by far the most number of attacks. Florida and Texas are close behind.

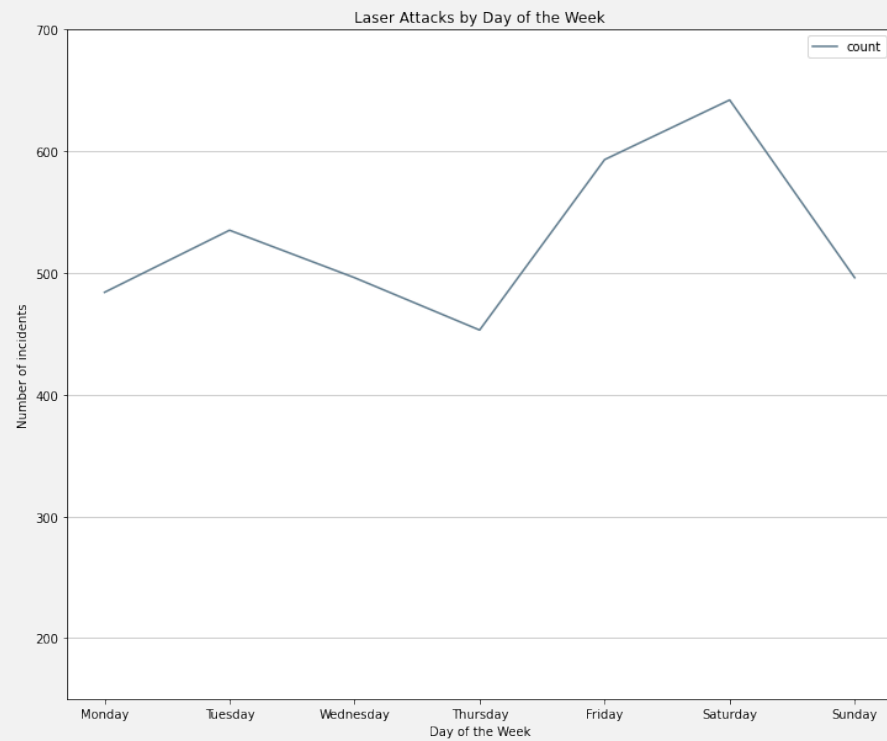
New York is surprisingly low down but the density of different states in the NE USA may be a factor.

## OTHER FACTORS



Lower altitudes have much higher risk, indicating the most critical point is take off and landing.

## OTHER FACTORS



Day of the Week does not appear to have a material affect on the attack rate.



## WHERE IS THE MOST RISK?

hour	STATE	Count
4	California	212
3	California	162
5	California	161
6	California	128
2	Texas	108
2	Florida	97
1	Texas	89
2	California	87
1	Florida	84
3	Texas	70
3	Florida	55
7	California	53
0	Florida	52
4	Texas	40
1	California	39

3 ways of categorizing Laser Attack Risk:

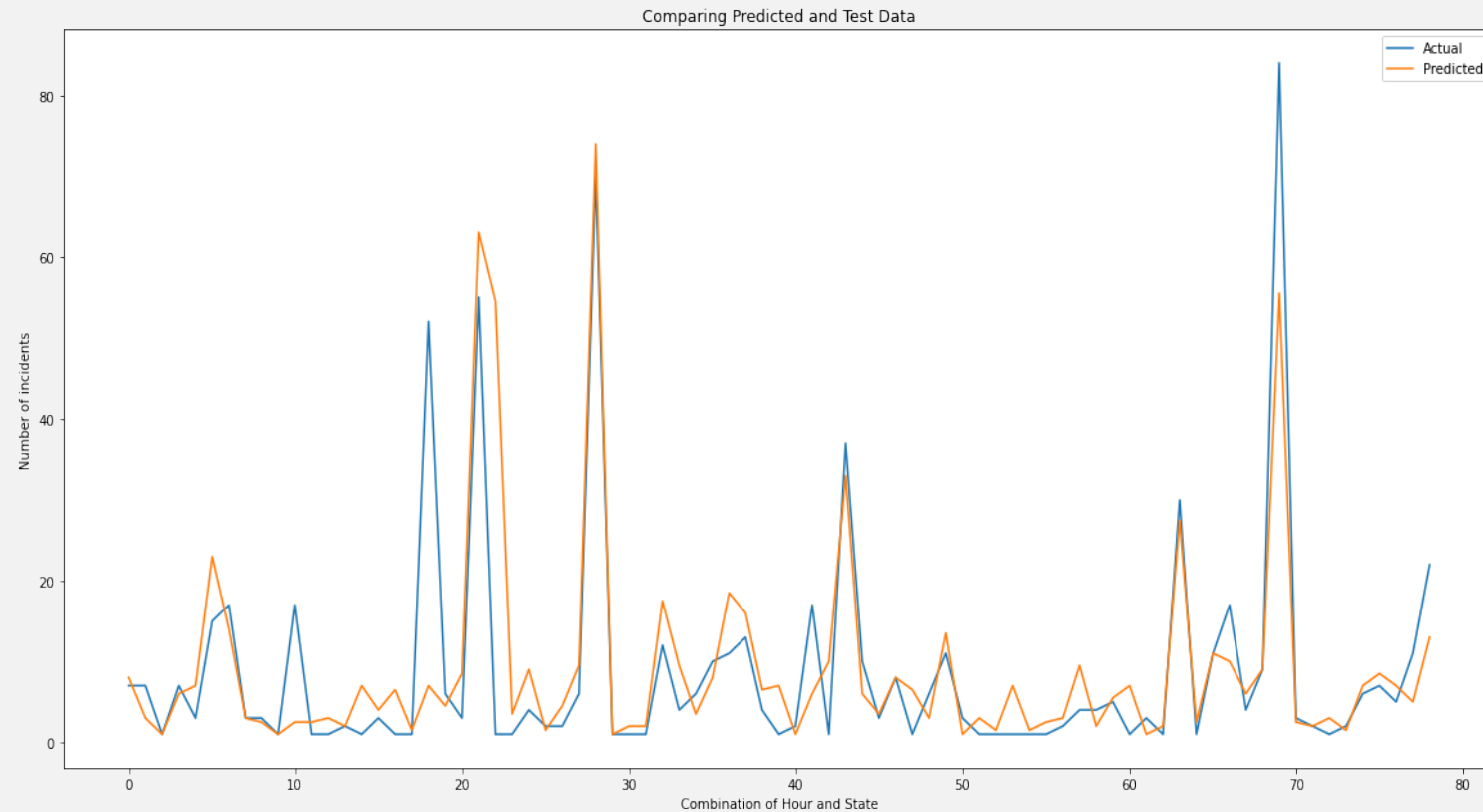
**RED** – 03:00 <—> 06:00 UTC in California

**AMBER** – 01:00 <—> 03:00 UTC in Texas and Florida,  
02:00 and 07:00 in California.

**GREEN** – Any other time and location.

# MAKING PREDICTIONS

K Nearest Neighbour Regressor can produce a good model.



## WHERE NEXT?

- Test Model on Future Years Data
- Consult with Airlines to see where analysis may be helpful
- Investigate hotspot areas within California