

# STATISTICAL ANALYSIS OF MIRAGE 2000D PERFORMANCE: UNVEILING INSIGHTS THROUGH DATA FOR THE FRENCH MILITARY

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## ABSTRACT

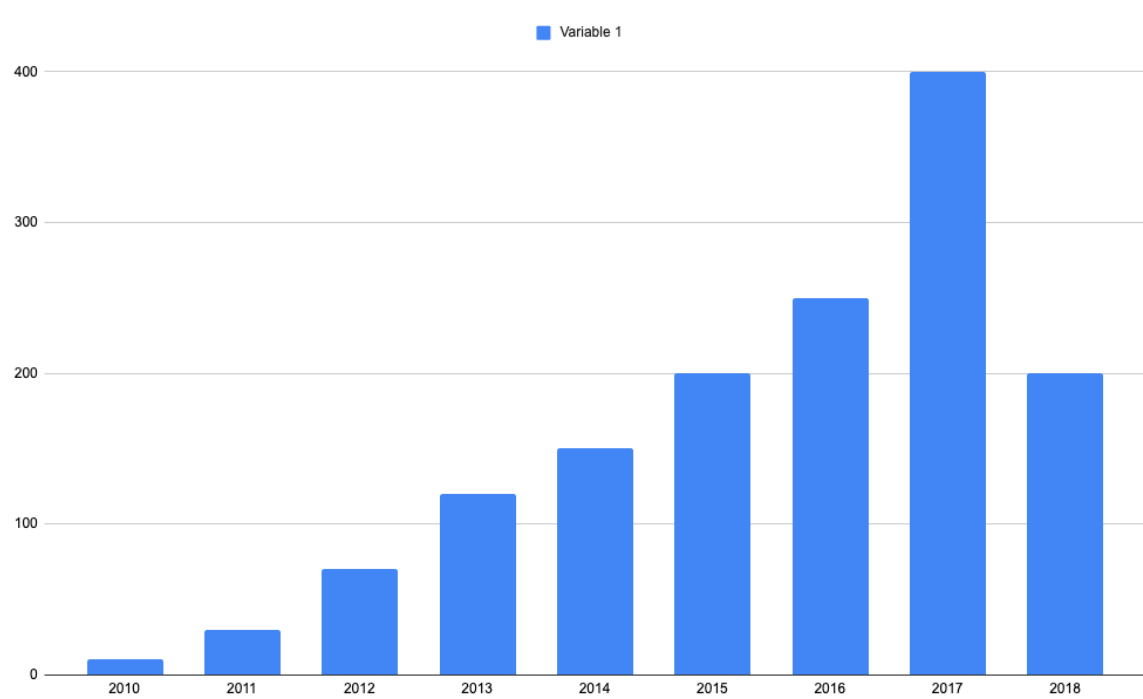
As an apprentice at DGA Techniques Aéronautiques, I actively contribute to a crucial project focused on military aircraft maintenance planning.

This involves analyzing data from flight tests, simulations, and actual flights to assess mechanical constraints on critical points. Precise calculations based on this data help determine the aircraft's damage levels over time, defining maintenance thresholds for optimal operational lifespan and fleet availability.

Our work directly ensures the safety, reliability, and sustainability of military aircraft operations.



Mirage 2000D



Number of MICA missiles fired per year

## MISSILES FIRED PER YEAR

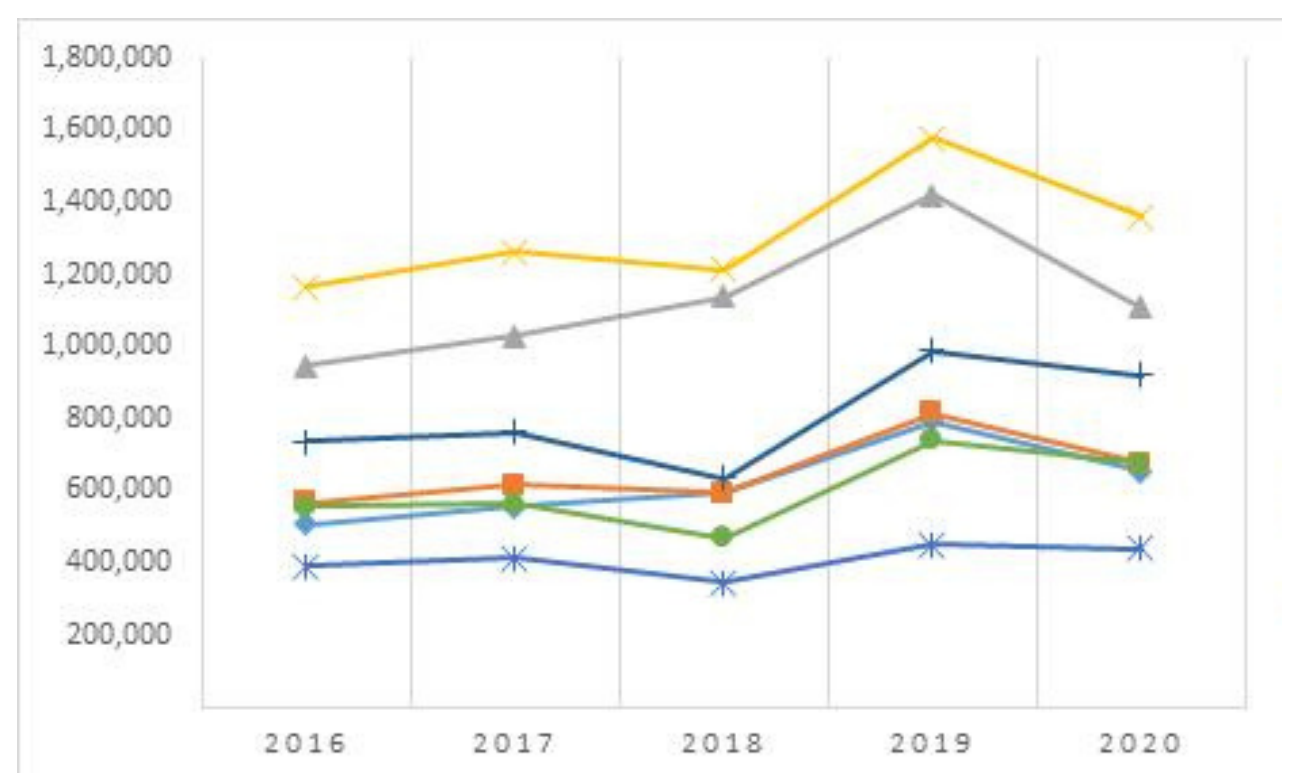
This involves retrieving flight data from the Mirage, studying the number of missiles fired per year, per squadron, and per configuration (where configuration refers to the aircraft's equipment during the flight), and then creating graphs to visually convey the analyzed data to the forces.

- Retrieve raw flight data.
- Filter and identify correct flights.
- Categorize and analyze flights according to the desired parameters.
- Create graphical representations.

## VISUALIZING AIRCRAFT FATIGUE

The task is to utilize the damage data calculated per flight to identify trends:

- Retrieve calculated damage data per flight.
- Calculate fatigue indices (FI) scaled for 1000 flight hours for ease of interpretation.
- Visually represent the FIs in the form of graphs, categorized by year, configuration, and load (where a load groups together several configurations).



Evolution of Fatigue Indices Based on Configurations

## CONCLUSIONS

In conclusion, this approach to analyzing aircraft fatigue trends, using Fatigue Indices (FI), provides a crucial perspective for military forces. By retrieving and interpreting damage data per flight, and graphically representing IF based on years, configurations, and loads, it allows forces to closely monitor the aging of their fleets. This in-depth understanding enables proactive adaptation to future needs, thereby ensuring the safety of pilots and optimal aircraft performance. Looking ahead, further studies will be conducted on a Rafale, employing artificial intelligence methods to process its data, paving the way for more advanced insights and applications in aircraft maintenance.

*The graphs presented on this poster are not from the actual studies as they are classified under restricted distribution.*