# Discussion 1.1

*Briefly summarize a problem or application you encountered in your academic or professional career and explain the importance of statistical ethics and the ramifications of failing to follow ethical statistical practice.*

In this discussion, I will give a brief description of a project we were working on in my previous job, where we were using statistics to summarize the outcome of the research problem. The project was related to an aircraft control problem. Aircraft control design requires a model of the aircraft dynamics, a model of the sensors, and a model of the actuators (engine and control surfaces like aileron, elevators and rudder) which affects the aircraft dynamics. Our goal was to analyze the effect of faults in the actuators and how to reconfigure and update the aircraft control in real time to improve the aircraft performance after faults occur.

We were using statistical measures to summarize the performance of the reconfigured controlled after faults occur. Initially we were analyzing the simulation data for one specific flight condition (altitude and velocity). Our design showed a high success rate for our control design, and we were about to capture those statistics in our final report. However, after a team discussion we realized that we should analyze the performance of our reconfigured controlled in a more realistic environment and use a larger set of flight conditions for our analysis. After performing the new analysis, we realized that the performance of our initial design was more optimistic that it actually was. This led to the conclusion that we had to redesign our reconfigured controller to enhance its performance over the larger set of flight data. Our next design iteration improved the performance of our design over a more realistic set of flight conditions.

It would have been unethical to report the statistical measures of our design performance if we did not mention our design considerations. I believe that being open about the data and the analysis methods created a fairer report. After reading the recommendations presented in (Gelman, 2018), I agree with the importance of “open data and open methods” in a statistical analysis. For future work, we will embrace the recommendations presented by the author in (Gelman, 2018).

References:  
Gelman, A. (2018). Ethics in statistical practice and communication: Five recommendations