DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Using X-Plane for Analyzing Aircraft Performance

Task for a *project*

Background

Several methods exist for assessing the performance of an aircraft, ranging from simple equations derived from fundamental mechanics to high fidelity simulations. For aircraft design the simpler approach is favored. However, it partly includes statistical or empirical methods which could lead to significant errors, particularly for unconventional aircraft. But using high fidelity approaches is not feasible because it would cost a lot of time and effort. A possible compromise is the utilization of commercial flight simulation programs which are not based on look-up tables but take account of the actual geometry of the aircraft. One of these simulators is X-Plane, which is based on the blade element theory. In this project it is to be analyzed in which scale X-Plane can be used for assessing the performance of different aircraft.

Task

In detail the following subtasks are supposed to be treated:

- Get familiar with X-Plane and the fundamentals of the blade element theory
- Shortly describe restrictions/assumptions of the blade element theory
- List the most important performance parameters needed for assessing an aircraft
- Explore which performance parameters can be analyzed with X-Plane
- Determine performance parameters for selected aircraft available in X-Plane
- Compare the aircraft performance according to X-Plane with real data
- Discuss the results

The report has to be written in English based on German or international standards on report writing.