



DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Efficient Autonomous Pushback and Taxiing – A Step towards Reduced Costs and Pollution

Task for a *Project*

Background

Current pushback and taxiing procedures are very fuel-inefficient and noisy mission phases. Furthermore, the necessity of a pushback tractor and a controller clearance to perform the operations leads to undesirable time consumption. However, two solutions have been proposed for this problem so far: a) Full towing aircraft from apron to holding area, b) Electrical driven nose landing gear. According to Virgin Airlines, “Towing aircraft from a stand substantially can reduce the amount of time they need to taxi with their engines running and reduces the time spent queuing before take-off”, but despite this operation has been used by some airlines, this improvement has not been clearly proven yet. On the other hand, it is claimed that an electrical driven nose landing gear may be the best solution for autonomous pushback and taxiing, but it is still under early development. This project is part of the aircraft design research project "ALOHA" (<http://ALOHA.ProfScholz.de>).

Task

The project task is to evaluate existing solutions as well as identify promising new solution for the efficiency improvement of the autonomous pushback and taxiing operations. The task includes

- gathering information about the current state-of-the-art of technologies and operations,
- proposing new and innovative solutions for the problem,
- checking feasibility of proposed technologies by means of draft system layout and sizing,
- comparing proposed solutions with the current operation in order to evaluate the improvement,
- identifying the most suitable technologies and further developments.

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