Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences

DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Flight Dynamics Model of a Box Wing Aircraft Using JSBSim

Task for a *Project* at HAW Hamburg

Background

Within the framework of the research project Airport 2030 (**Airport 2030**), the Flight Dynamics Model (FDM) of a box wing aircraft is defined. An FDM is a physical/mathematical model that defines the motion of an aircraft under aerodynamic and inertia forces and under the forces and moments applied to it by the control surfaces. JSBSim is an open source FDM, which models the aerodynamic forces and moments by the classic coefficient buildup method. JSBSim is currently the default FDM of FlightGear, an open source flight simulator. Since JSBSim has no native graphics, FlightGear provides a realistic graphic environment for flight simulation. An FDM of the box wing aircraft has already been developed for cruise, using the SDSA tool of CEASIOM. Therefore this project mainly focuses on the integration of take-off and landing into the FDM.

Task

An FDM for FlightGear will be defined focusing on the take-off and landing configuration, in order to simulate the flight of the box wing aircraft. This allows for a more subjective evaluation of the handling qualities of the aircraft (see Cooper-Harper rating scale). The following tasks will be considered:

- Get familiar with JSBSim and FlightGear
- Obtain the aerodynamic coefficients and derivatives of the aircraft (take-off, landing)
- Define the FDM of the aircraft with JSBSim
- Define the geometric model of the aircraft for FlightGear
- Configuration of FlightGear
- Flight tests with JSBSim scripts
- Flight tests with FlightGear

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