



MALAFI

Multi Axis Levitation Aerodynamic Forces Instrument

Project Summary

The aim of MALAFI project is to develop an instrument for aerodynamic force measurement. The Institute of Industrial Automation (iAi) and aero technic Laboratory (CMEFE) part of the University of Applied Science of West Switzerland developed this project. This instrument could measure forces and torques in the 6 degrees of freedom. The principle of the measure is the electromagnetic force compensation.

The instrument is composed by 3 actuator current control unit connected by a real time fieldbus (EtherCat) with a PC equipped with real time OS (Speed Goat). We have 6 independent electrodynamic actuators controlled by 3 DSP units with a time step of 50 us. For the position control we have 6 Laser position sensors giving each ms the position of the PC.

The ranges of force magnitude go from 0.03 to 45 N, for the torques magnitudes goes from 0.003 to 4.75 Nm.

The positioning of the measurement table is less than 10 um and the maximum current in the actuators is up to 4 A RMS. The system is equipped with permanent magnet in order to compensate the weight of the object we need to characterize.

Valorisation

An article was published on the Revue Polytechnique Romande. The prototype was exposed into the national exhibition SINDEK 2012, specialized on the automation and measurement system.

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This project has been carried out by HEIG-VD/iAi in collaboration with hepia/CMEFE