Abstract:
Recent advances in neuroscience made it possible for people to issue commands with their brains via non-invasive electroencephalography electrodes. Such commands have already been used for online control of various dynamic systems. Current research activities aim at assessing if this technology could successfully be applied to aircraft control. For this purpose, a flight controller that uses the output of brain machine interfaces (BMI) to provide control over a light airplane's flight path, was designed. Subsequent pilot-in-the-loop experiments in a fixed base flight simulator were performed with two different BMIs. A well proven motor imagery BMI and a novel BMI relying on user training were used to control the horizontal airplane motion in different operational and laboratory tasks. This paper discusses the differences between the two BMIs, some of which became evident during the experiments from quantitative measures as well as pilot comments, and their implication on airplane handling. Results indicate that the motor imagery BMI provides better control performance for some people, whereas the operant BMI is better suited for an operational application of brain control.