

Influence of First-Order Lead Visual Cue on Roll Compensatory Control by Human Pilot

by

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Abstract

A pilot controls the movement of his aircraft in the air, mainly observing the movement of its outside visual field, which plays a great role as a visual cue in handling the aircraft. If the virtual visual cue obtained by modifying the real movement of the outside visual field is given to the pilot, how are his handling qualities and task performance influenced? In this study, as the first simple case, the effects of the virtual visual cue obtained by adding a first-order lead compensation to the real roll response of the airplane were investigated in the roll compensatory control task using a fixed-based flight simulator. The results show that, as the time constant value of the applied first-order lead approaches the time constant value of the roll mode, the easiness of pilot's handling increases, and the task performance is degraded very small or is improved a little. These results indicate that the flying qualities of airplanes may be improved by giving a pilot the virtual visual cue without repairing the flight characteristics of airplanes.

Keywords: Human Pilot, Airplane, Roll Control, Virtual Visual Cue, Roll Mode

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