Visual touchdown point perception during simulated landing - Abstract

This study investigated visual touchdown point perception during simulated fixed-wing aircraft landing approaches. Experiments examined the effects of day versus night lighting, smooth versus buffeting simulated approaches, as well as a variety of other visual scene manipulations, including the presence or absence of: (i) 3-D buildings; (ii) a runway outline; (iii) a false explicit horizon; (iv) a true explicit horizon; and (v) different types of ground plane texture (random vs grid). After 4s exposure to each simulated landing approach, participants pointed to the location of their perceived touchdown point using the computer's mouse (performance feedback was provided on some trials). While our lighting, scenery and feedback manipulations significantly altered touchdown point judgments, performance was unacceptably imprecise and biased in all of the conditions tested. The findings provide further evidence that, by themselves, optic flow based perceptions of touchdown point are not sufficient for a pilot to safely land an airplane.