

Measuring head-down time via area-of-interest analysis: operational and experimental data

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Abstract

The so-called “Head-Down Time” (HDT) problem refers to the potential inability of an operator (e.g. a tower air traffic controller) to optimally divide attention between the primary visual field (out the tower window, for instance), and an auxiliary tool (usually in the form of a visual display screen). Recently-increased attention to the “runway incursion” problem has focused concern on the role that HDT might play in aerodrome ground safety — that is: What are the potential risks of HDT, and how are future Air Traffic Management developments likely to impact these risks? In the case of aerodrome surface movement, the question applies to three groups: tower / ground controllers; flight deck crew; and vehicle drivers.

An ongoing research project being carried out for EUROCONTROL is investigating in two phases the role and impact of HDT in aerodrome operations. An initial operational review phase identified HDT as a current and potentially important future issue, especially for tower air traffic controllers. Thus far, almost no research has been devoted to this potential problem. In the subsequent, experimental phase, a series of real-time simulations with tower controllers showed that controllers spend a majority of their time looking elsewhere than out the tower window. Not surprisingly, this was largely driven by external visibility conditions, and less so by the presence of auxiliary displays.

Introduction

The Runway Safety problem

The safety of civil aviation has improved greatly over the last half century. Improvements in terms of Communication, Navigation and Surveillance (CNS) capabilities, mechanical reliability, etc. mean that in-flight accident rates are now remarkably low. However, one persistent, and potentially growing, threat is the ground phase of operations, including landing, taxiing, and takeoff. Indeed, the most lethal aviation accident in history took place on the ground, when two loaded 747s collided on the runway at Tenerife in 1977, claiming a total of 583 lives. The chief threat to runway safety is the risk of “runway incursion,” or conflict between an aircraft and either another aircraft, a vehicle, or a pedestrian.

In D. de Waard, K.A. Brookhuis, R. van Egmond, and Th. Boersema (Eds.) (2005), *Human Factors in Design, Safety, and Management* (pp. 427 - 436). Maastricht, the Netherlands: Shaker Publishing.