Evaluation of a Radical ATC interface

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Abstract

A design study of en-route Air Traffic Control (ATC) suggested that the primary role for the human controller should be conflict resolution. A model en-route system "TROTSKY" was developed, working from the proposed tasks of the human operator to the way in which data should be presented, taking into account human perceptual processes, and potential tools to allow the controller to interact effectively with the system. A trial was carried out using students from the University of Paris V (René Descartes) in which 26 students, after a general briefing and twenty individually coached examples, carried out two sessions corresponding to one hour of traffic (200 aircraft per hour – 40 present simultaneously), resolving conflicts as presented. The mean time to construct an order was 14 seconds, and a mean of 30.4 orders was required to solve a mean of 33.8 conflicts. Only 2 of 1720 conflicts were not resolved correctly, and only 5 of 10468 aircraft left at a time, position or height different from that planned. The advantages of such a system in terms of cost, efficiency, safety and strain reduction would be considerable.

Introduction

Space does not permit detailed discussion of the derivation of the radically revised ATC system of which an evaluation is presented here. In principle, the system is designed around the known, relatively inflexible, cognitive abilities of human controllers, using currently available modern technology, assuming that engineering problems, such as system reliability, can be solved, rather than assuming that the current inflexible, unplanned and wasteful system will be maintained on dubious 'safety grounds'. Briefly, an examination of the 'En-Route' ATC system, summarised in Dee (1996), led to the publication of EUROCONTROL Experimental Centre (EEC) Report 307, (David, 1997). This report describes how En-Route ATC can be re-designed to provide a human-oriented task (primarily conflict resolution) supported by computer-based facilities, employing satellite communication and navigation systems. After a careful task definition, a set of task analyses assuming different levels of human involvement were carried out, and a semi-automated system was adopted. Sub-tasks were allocated to define a satisfying, functional human controller task. Error-free conflict detection by human controllers in a direct

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