Empowerment of the planning controller in the use of Controller-Pilot Data-Link Communication (CPDLC)

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Abstract

It is common practice in air traffic control that two operators on the ground, the executive controller (EC) and the planning controller (PC) provide the air traffic control service for their sector. The working method used is based on rather rigid task-sharing between the EC and the PC. Voice communications between the ground and the air crew, i.e. issuing instructions via radio to the pilot and listening for requests and read backs from the pilot, represent a large proportion of the EC`s task. Controller-Pilot Data-Link Communication (CPDLC) provides a second parallel and independent communication channel that can be used by either controller.

This paper presents the results of a simulation conducted at the CEATS Research, Development and Simulation Centre (CRDS) in Budapest between 27 November and 8 December 2006. The main aims of this study were to develop a flexible task-sharing method between the EC and the PC and to explore the potential of this method to ease EC workload. The task-sharing between the EC and the PC is flexible in the sense that the EC can delegate CPDLC tasks to the PC and resume them. This method was evaluated against a use of CPDLC with no delegation. Both methods were compared under various levels of traffic density and with different proportions of aircraft in the airspace being equipped with CPDLC. Indicators of workload, situation awareness, controller communication performance, and assessments of subjective team performance were used for these comparisons. Results indicate that the expected performance benefits could not be fully exploited in higher traffic because of an increased demand on intra-sector communication between EC and PC for which the system did not provide enough procedural and HMI support.

Introduction

Today, air-traffic control operation relies on a division of the airspace into sectors. Basically, sectors are three-dimensional volumes of airspace stacked at various altitudes. Commonly, two operators on ground, the executive controller (EC) and the planning controller (PC) possess control authority for one sector. It is the primary role of the EC to ensure, that all aircraft she/he is responsible for are separated. The aircraft can be separated either vertically or horizontally according to standards of