

Designing for the future: a cognitive adaptive Man-Machine-Interface

Claudia Keinrath¹, Michael Dorneich², & Jiří Vašek¹
¹*Honeywell International, Brno, Czech Republic*
²*Honeywell Laboratories, Minneapolis, U.S.A.*

Abstract

The forecasts of the International Civil Aviation Organization envisage a growth in world air travel of 5% per annum until 2020. The air traffic in Europe is therefore expected to more than double by 2020. In order to deal with the growth, the European Air Traffic Management (ATM) system will undergo major changes. The envisaged next generation ATM will require new technologies to meet future collaborative decision making, self separation, precision 4D path following, and closer aircraft spacing. The CAMMI (Cognitive Adaptive Man Machine Interface) program addresses human factors priorities in various domains by developing concepts that balance operator workload, support added future operator roles and responsibilities and resulting new task and information requirements, while allowing operators to focus on the most safety critical tasks. In the aviation domain current pilot interface applications are inadequate to support pilot performance under increased workload and responsibility. The envisioned ATM capabilities will only be realized with increased automation, therefore the development of adaptive information management, display management, and task management aids is a necessity. The paper discusses the CAMMI project and presents concepts to address the challenges presented by future flight operations.

Introduction

The current Air Traffic Management (ATM) system is already near operational limits. New innovations in the structure of ATM will be needed to handle the expected increased demand in traffic. However, such innovations will necessarily impact the distribution of tasks and responsibilities between the air and the ground, as well as the roles and responsibilities of flight deck automation and human operators. These two trends lead, even under today's conditions, to situations of high workload for all involved. New concepts like precision 4D path following, self separation, and closer aircraft spacing will be needed to increase capacity and efficiency. These types of ATM innovations will necessarily affect aircrews operations and will impact their workload.

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