Applying Work Domain Analysis to study airport collaborative decision making design

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Abstract

This paper outlines the usage of a Work Domain Analysis (WDA) for the assessment of operational information requirements for pilots during Airport Collaborative Decision Making (A-CDM). A-CDM presents unique challenges for decision support during dispatch of aircraft and passengers. Decisions by participating airport partners require an understanding of own capabilities as well as the capabilities of participating actors like pilots, air traffic controllers, or other actors involved. While some situations can be pre-planned, decision makers during turn-round operation will always be faced with unanticipated situations resulting from unknown variables in the environment or technological capabilities.

Work Domain Analysis (WDA) is a technique which allows to model systems by using event-independent representations that can be used to cope with such unanticipated situations. However, to confirm that this technique can be applied usefully, an early validation is required to ascertain that the WDA is relevant to the problem context. This paper presents an approach for confirming a WDA by using pilots as subject matter experts (SMEs) during aircraft turn-round. Firstly, pilots' operational information requirements were identified via an Abstraction-Decomposition Space (ADS) of the A-CDM system developed by the analysis. Then, pilots were asked via a survey to report about events where problems with operational information sharing were encountered during turn-round. Finally, these events experienced by the pilots were mapped through the pilots' information requirements derived from the ADS. The results reveal that pilots' information requirements are not entirely satisfied by current approach to A-CDM and provide confirmation for the usefulness of the WDA to the proposed application as a technique for an A-CDM interface design cycle.

Introduction

Airport Collaborative Decision Making (A-CDM) has been introduced in Europe during field trials at selected airports as a concept which aims at improving air traffic flow and capacity management at airports by advancing the communication and information sharing between the various actors at an airport. The A-CDM work