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Work domain analysis for assessing simulated worlds for ATC studies

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Work Domain Analysis (WDA) was used in a study of the workload of en route Air Traffic Controllers (ATCos) to help characterise the fit between different ATC simulated worlds and our research aims. A WDA captured the ATCo's reasoning space in a way that exposed potential sources of workload, and it was then applied to three cases. Case 1 was the use of a simple laboratory program originally developed to study basic cognitive processes relating to conflict detection and separation. The program captured simple work domain properties relating to safety only. Case 2 was the use of an interactive ATC microworld to study ATCos' separation strategies and workload. The microworld captured a broader range of work domain properties related to safety and expeditiousness. Case 3 involved the evaluation of a task load metric in a full-scale ATC simulator operated by our industry partner, Airservices Australia. The simulator captured the broadest range of work domain properties related to safety, expeditiousness, and orderliness. Overall, WDA can be a useful tool for (a) helping research teams determine the appropriate level of work domain fidelity to examine specific research questions and (b) communicating the strengths and weaknesses of different simulated worlds for the purpose of research.