

Modelling Mental Actions in Simulated Air Traffic Control

– Demonstration –

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During the last four years, our research group conducted several experiments on data selection, transformations of information, and anticipation of flight constellations by controllers in air traffic control. The project was named “En-route Controller’s Representation (EnCoRe)”. The experimental work has been rendered possible by a realistic simulation of the control task, providing a running radar presentation, a radio-communication between the controller and pilots, and the unusual alphanumeric “flight strip”-informations. This simulation of air traffic scenarios is called “EnCoRe-PLuS”.

According to our experimental results we developed a conceptual model of the controllers mental activities (“EnCoRe-MoFL”) and have begun to implement this model on DOS-basis. The implementation is done in ACT- R and in LISP. This model of the controller communicates with the air traffic simulation (written in C++), selecting actively information provided by the simulation, and constructing a representation of the controlled traffic. This representation is updated recursively. In cases of potential conflicts between flights a further cycle is activated, anticipating courses of flights, and eventually initiating actions to prevent an actual conflict. Hereby EnCoRe-MoFL provides for continuous surveillance of the scenario, and feeds back information to EnCoRe-PLuS in analogy to the controller’s interventions.

The controller’s mental Model “MoFL” has been implemented in a first basic version. The research project is set to elaborate and to evaluate MoFL by comparing the models states and actions with activities of controllers. In a further step, MoFL should serve to test and to predict changes within the information input which correspond to automatic support systems in air traffic control.