



The 1st International Conference on Cognitive Aircraft Systems – ICCAS

March 18-19, 2020

<https://events.isae-supaero.fr/event/2>

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Permanent link : <https://doi.org/10.34849/cfsb-t270>

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Eyetracking on the battlefield: A job analysis in the A400M operational test program

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Content

In the A400M operational test program led by the French Air Warfare Center, the Human Factor Department was tasked to carry out a workload analysis for tactical missions. The final objective is to define the profile of a third crew member. This additional crew member could be integrated in tactical missions to assist the two pilots crew.

The Human Factor specialists have used the following methodology. First, we analysed the two pilot crews activity to identify limits of the task sharing, limits of the procedures and critical situations related to goal achievement and security. Then we have understood the effects of the determining factors in order to produce ergonomics recommandations. All the valuations were performed during international tactical exercices. No specific demands related to the study were expressed and workload assessment was integrated in planned tactical missions.

The first step consisted in the qualification of experimental protocol with correlations between subjective and objective workload data. Eyetracking, subjective task load scale, observation and interviews brought valid data. Yet, some limitations emerged due to the need of tools synchronization.

During the second step, real drops have been performed and significantly affected the crew workload. At this stage, the need for a better understanding of the A400M crews activity appeared necessary for a further analysis. Thus, the job analysis was extended with a restitution mission tool and the integration of check-list procedures. Results showed the effect of experimental workload and other parasitic workloads. However, overall workload was not consistent with operational activity due to the lack of coordination with others aircraft.

The third step was the opportunity to analyse crews activity in collaborative tasks. Tactical missions have induced coordination with multirole friendly fighter aircrafts and air traffic control. At this point, workload analysis was not quantitative anymore with overload detection but stricly qualitative by assessment of synergy and efficient task sharing. Produced recommandations were relatively close to the real activity to be directly usable by A400M crews.

Still pending for the last step required, Human Factor specialists need to perform workload assessment in a significant realistic environment. For that purpose, A400M crews have to realize real drops in a tactical mission which implies the coordination with friendly fighter aircrafts against ennemy fighter aircrafts and ennemy ground defense systems.

Keywords : Eye tracking, EEG, fNIRS, Other measurement methods, Brain computer interfaces