A Review of Cognitive Systems Engineering in Aviation

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Abstract: Although the increased level of automation on the flight deck has resulted in lower pilot workload, improved flight technical performance, and safety enhancements, new problems related to pilot situation awareness and system understanding have also emerged. Issues such as information ambiguities, intent confusion, and counterproductiveness in unanticipated events have become new causes for accidents. Ideally, a cooperative process would be desired, in which the automation enables pilots to function to their full potential by keeping them continuously involved in the decision-making loop. This paper provides an overview of utilizing the Cognitive Systems Engineering (CSE) approach to mitigate issues in flight deck design. As such, it provides a review of CSE applications in the aviation domain and discusses their main outcomes, state of the art, challenges, and recommendations for future investigations.

Keywords: Automation, aviation, cognitive systems engineering, displays, human-machine interface.