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Design of a Procedure Analysis Tool (PAT) for the FAA Human Factors Certification Process

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Abstract: Devices on airliners are certified by FAA to comply with safety standards. This process is currently accomplished by both inspection and Human-In-The-Loop (HitL) testing – a time-consuming and costly process. A new Regulation FAR25.1302 requires analysis of all procedures; increasing certification costs beyond current capacity.
The proposed Procedure Analysis Tool (PAT) is a decision support tool designed to meet FAR25.1302 requirements. PAT simulates pilot performance time on the device under evaluation. The output of PAT is a frequency distribution showing the number of pilots versus time to complete one procedure. The percentage of pilots performing the procedure in excess of a user defined threshold represents the Probability of Failure to Complete (PFtoC) the procedure. Procedures with long right tails are flagged for HitL testing. PAT was demonstrated on 15 procedures to assess the Multifunction Control Display Unit (MCDU). Analysis shows that the PAT reduces the evaluation cost by 70% per function.

Keywords: Procedure Analysis Tool, Cockpit Design, Human Error Identification, Predictive Modeling.