Automated, Objective Assessment of Pilot Performance in Simulated Environment

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Abstract : Nowadays flight simulators offer tremendous possibilities for safe and cost-effective pilot training, by utilization of powerful, computational tools. Due to technology outpacing methodology, vast majority of training related work is done by human instructors. It makes assessment not efficient, and vulnerable to instructors’ subjectivity. The research presents an Objective Assessment Tool (gOAT) developed at the Warsaw University of Technology, and tested on SW-4 helicopter flight simulator. The tool uses database of the predefined manoeuvres, defined and integrated to the virtual environment. These were implemented, basing on Aeronautical Design Standard Performance Specification Handling Qualities Requirements for Military Rotorcraft (ADS-33), with predefined Mission-Task-Elements (MTEs). The core element of the gOAT enhanced algorithm that provides instructor a new set of information. In details, a set of objective flight parameters fused with report about psychophysical state of the pilot. While the pilot performs the task, the gOAT system automatically calculates performance using the embedded algorithms, data registered by the simulator software (position, orientation, velocity, etc.), as well as measurements of physiological changes of pilot’s psychophysiological state (temperature, sweating, heart rate). Complete set of measurements is presented on-line to instructor’s station and shown in dedicated graphical interface. The presented tool is based on open source solutions, and flexible for editing. Additional manoeuvres can be easily added using guide developed by authors, and MTEs can be changed by instructor even during an exercise. Algorithm and measurements used allow not only to implement basic stress level measurements, but also to reduce instructor’s workload significantly. Tool developed can be used for training purpose, as well as periodical checks of the aircrew. Flexibility and ease of modifications allow the further development to be wide ranged, and the tool to be customized. Depending on simulation purpose, gOAT can be adjusted to support simulator of aircraft, helicopter, or unmanned aerial vehicle (UAV).

Keywords : automated assessment, flight simulator, human factors, pilot training

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