

Integration of Automated Object Detection and Tracking System in Full Motion Flight Simulation System

^aTheus H. Aspiras, ^aVijayan K. Asari, and ^bChristopher J D Neal

^aUniversity of Dayton Vision Lab, Dayton, Ohio, USA

^bMerlin Products Limited, West Sussex, England

ABSTRACT

The paper will describe how the University of Dayton Full Motion Flight Simulation System will be integrated with the University of Dayton Vision Lab automated detection and tracking system (ADTS) to provide a closed loop simulation of the real world environment, within which the automated system is intended to be used when installed on an air vehicle. The paper will detail how the UD Flight Simulator visual system graphics are interpolated into the ADTS system, making use of the simulated ground vehicles and weather effects. Components of the ADTS system will utilize imaging and information from the Flight Simulator to provide analysis of the surrounding scene. It will also detail the vector data outputs to the simulated autopilot control algorithm generating demands to the flight simulation, with attendant correctional feedback to the ADTS system. The paper will further describe the projected extension to enable the evaluation of manual control through in cockpit data display to the pilot, as a complement to the fully automated air vehicle guidance. The paper will emphasise the environmental and safety benefits of the described method of systems testing using the UD Full Motion Flight Simulator, with emphasis on the importance of the fidelity of the visual graphics in testing the ADTS system.

BIO PRIMARY AUTHOR

Dr. Theus Aspiras is a Research Engineer in the Electrical and Computer Engineering Department at the University of Dayton. He is currently working under Dr. Vijayan Asari in the University of Dayton Vision Lab Center of Excellence for Computer Vision and Wide Area Surveillance Research and has worked with Vision Lab for 6 1/2 years.

Dr. Aspiras received his Bachelor's degree in electrical and computer engineering from Old Dominion University in 2009, his Master's degree in electrical engineering from University of Dayton in 2012, and his Doctoral degree from University of Dayton in 2015. He has published 2 book chapters, 2 journals, and 12 conference papers. His current research areas include object detection and tracking, brain signal analysis, machine learning, and neural networks.

Dr. Aspiras was awarded with best paper awards in International Conference on Information Processing 2011 and 2012 in India, International Conference on Information, Communications and Signal Processing 2011 in Singapore, and Applied Imagery Pattern Recognition in 2015.