

Project Title: Virtual Reality Aircraft Training Simulation Technology Development

Adviser: Andrew Palla, Vertex Solutions, Director of Research & Technology

Background:

Vertex Solutions is a human performance training and consulting company based in Urbana, IL. For more than 20 years, Vertex has offered an integrated portfolio of services centered on technology-enabled learning to help Government and commercial clients meet their unique human performance development needs and improve leader, individual, and collective performance.

The U.S. Air Force Special Operations Command (AFSOC) chose Vertex to lead an effort similar to the Air University's Pilot Training requirement: the development of revolutionary VR aircrew training. Vertex's highly skilled cross-functional team has worked closely with AFSOC and our corporate partners to develop and integrate a suite of state-of-the-art technologies to provide a truly immersive VR part task trainer (vrPTT) for AC-130U copilots. The vrPTT combines the latest head-mounted display (HMD) technology with Leap Motion controllers to track bare-handed copilot finger movements and enable interaction with a detailed virtual cockpit control panel with dynamic feedback and micro-adaptations provided by an integrated intelligent tutor system (ITS). Hand-tracking is implemented via Vertex's VertexMultiSensor (VMS) software which enables integration and mixing of multiple human machine interface (HMI) technologies, including biometric sensors and alternatives to Leap Motion hand-tracking. A laptop computer contains the crew station simulation, graphics processing, mission scenarios, aircraft state machine and flight dynamics, and the ITS for a fully portable capability. Bohemia Interactive's Virtual Battlespace (VBS) is used as the game engine. VBS is a program of record for the Army and the Marines and has received Risk Management Framework certification to run on government networks and is widely adopted in the DoD simulation space. Flex-Air is used as the aircraft cockpit state machine and to model aircraft flight dynamics.



Figure 1: AC-130U vrPTT VR Simulation



Project Description:

Successful applicants will have experience programming in C++ and will participate in virtual reality technology development efforts as required by program goals. Areas of active development are human machine interface sensor technology development, integration, and testing, biometric sensor integration and testing, simulated system state machine development, and integration of machine learning algorithms and approaches with VR training technologies.

Point of Contact: Andrew Palla (andrew.palla@vertexsolutions.com)