# Research Project Description

In addition to the needs of project STTR N07-T028 Tools for Virtual Environment Fidelity Design Guidance, Quality of Training Effectiveness Assessment (QTEA) Tool, we use the video link that is part of this experimental application for airborne testing of Live Virtual Constructive (LVC) training paradigms. This requires a number of subject matter experts (SMEs) to observe the OPL's L-29 research aircraft while in flight. Because the aircraft is small, we use the video link (presently approved under STA 0486-EX-ST-2009) to give the SMEs the ability to observe the aircraft performance from the ground while the aircraft is in flight.

In-flight virtualization is an emerging training paradigm in which the flying cockpit is one and the same with the fighting cockpit and the simulation cockpit. This means that an aircrew could train simulated, virtualized scenarios with their aircraft while flying or while parked. This paradigm has several advantages. First, the simulator and the aircraft are the same asset. This reduces overall systems procurement cost and affords a level of portability and deployability for embedded training that cannot be matched by a pure simulator asset. Furthermore, the context of the training scenario is the real-world, albeit possibly in a proxied location and augmented with symbology. In the world of in-flight virtualization, there is no such thing as a difference between the simulation and training world.

Our approach involves replacing specific real-world artifacts with simulated assets, but retain selected real-world assets to overcome the shortcomings of a purely simulated training network. This blend of real and simulated assets is expected to lead to better transfer of training than a purely real-world or a purely simulated training environment. Furthermore, we propose to blend the airborne asset with a flight simulator, thus providing an airborne flight simulator capability that dramatically broadens the realm of possible training mission scenarios that can be flown. Integration in such a distributed fashion is a new methodology and future avionics systems should be designed to support both simulated and real-world inputs. One concern is that we do not currently know how well the airborne trainee can adapt to changing in and out of the augmented simulation into real-world operations when immediate attention is required in the real world. We will virtualize an environment that will replicate a 4-5gen fighter or tactical trainer.

It is important to develop a path forward to show how real and simulated avionics will approach each other and eventually become the same. We equiped the back seat of the Cognitive Delfin (COD) with generic head-down display (HDD) hardware, simulated head-up display (HUD) hardware, and generic Hands-on Throttle and Stick (HOTAS) controls. We realize that the Cognitive Delfin (COD) is not equipped with current fighter aircraft avionics but we claim that the COD can serve as the generic model for future in-flight virtualization avionics.

The video link provides us with the ability to study the performance of the aircraft and pilot through subject matter observation from the ground.

This work is in the public domain and is not restricted or classified in any way.