AFWERX SBIR ★ STTR

SUCCESS STORY

High-Value Experiential Training & Education Rapid Process/Model Prototype

NEXT GENERATION VR TRAINING FOR AIR REFUELING MAY REDUCE TRAINING COSTS

TOPIC NUMBER: **AF192-D001**

CONTRACT NUMBER: **FA8649-19-C-A036**

SBIR COMPANY NAME: **SPECULAR THEORY**

TECHNICAL PROJECT OFFICE: **97TH OPERATIONS GROUP, ALTUS AFB, OK**

SPONSORING ORGANIZATION: **97TH OPERATIONS GROUP, ALTUS AFB**

PUBLISHED: **NOVEMBER 2021**

THE BASICS

- Next generation virtual reality flight simulation training system designed to train pilots in air to air refueling.
- Reduces number of failures and can help to retrain those who initially fail, reducing cost and time per student.

Photo courtesy of Specular Theory

TRAINING PILOTS IN THE RISKY SKILL OF REFUELING AIRBORNE AIRCRAFT HAS LONG BEEN A PRICEY ENDEAVOR, COSTING THE AIR FORCE THOUSANDS OF DOLLARS PER PRACTICE RUN. SPECULAR THEORY LOOKS TO HELP WITH THEIR NEW VIRTUAL REALITY TECHNOLOGY.

With the support of SBIR/STTR, California-based Specular Theory has developed a next generation virtual reality flight simulation training system designed to train pilots in air to air refueling.

Traditional air refueling training costs the Air Force thousands of dollars per flight, which requires at least two aircraft and two full crews. Many times, students require extra flights to gain proficiency, adding cost and time. This virtual training program is poised to reduce the number of failures, and can help to retrain those who initially fail, reducing the number of times they must practice in a real aircraft. The estimated savings could be huge.

Because of the initial feedback from this project, the Air Force has requested that Specular Theory expand its virtual training programs to other types of aircraft, which could lead to many other contracts for the company.

Specular Theory is currently in development of a similar program for the B-52 aircraft, and is investigating the feasibility for numerous other requested aircraft.

BEHIND THE TECHNOLOGY

Previous to the virtual training, it was a difficult and expensive endeavor to train a new pilot in air to air refueling for the C-17 and KC-135 aircrafts.

Students have five sorties and a checkride programmed to learn air refueling and other aircraft commander competencies. Following an unsuccessful training sortie, a prospective aircraft commander would receive an individualized training program with an instructor, which added strain to an already stressed training system. This program traditionally included additional ground time as well as sim or flight time.

continued

continued from page 1

Specular Theory's virtual training program looks to reduce the strain of all of these problems. Through a VR flight simulator, an artificial intelligence (AI) instructor, and a wide variety of over thirty possible courses, the VR training shows promise to reduce the number of needed practical attempts, reducing the cost and time per student and reducing the number of failed flights.

The program was developed by partnering the company's virtual reality team with Air Force flight instructors and staff to analyze common student errors and determine how to use virtual reality experiences to best adjust student behavior.

The VR technology is built on traditional gaming tools and is fully upgradable because it was built with inexpensive consumer-grade hardware, which allows it to evolve at the speed of technology. It allows users to learn in multiple modes, for maximum usability.

This program currently being used by the 97th Operations Group at Altus Air Force Base, and partner wing units at the 62nd Airlift Wing at McChord Air Force Base, 305th Airlift Wing at JB McGuire-Dix-Lakehurst, 437th Operations Group at Charleston Air Force Base, and 436th Airlift Wing at Dover Air Force Base.

SBIR FUNDING AND USAF'S EXPERTISE WERE CRITICAL

The funding received through the Air Force SBIR program were essential to the development of the project.

Though the company's products were proven in consumer space for over eight years, SBIR funding allowed Specular Theory to adapt their existing products into a student immersive experience that was not previously available in their consumer applications.

The SBIR program invested about $1.5 million into the project and the finished product has earned the company $5 million dollars in Phase III contracts.

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