

## The League of Extraordinary Simulators



### *The League of Extraordinary Simulators*

**Air Force special forces train to extraordinary levels to be able to run a busy airport with military and commercial flights or command multiple combat sorties and differing platforms in the field under grueling combat conditions.**

**By J. Michael Brower**

While several varieties of air traffic control (ATC) systems exist to ensure aircraft safety, efficiency and effectiveness, some of these have more weighty missions than others. For the special operations forces (SOF), the best is the only acceptable level of quality. The infusion of leading-edge ATC realism into a virtual reality world is intended to minimize actual bleeding in sentient battlespace. While aircraft control simulations cannot guarantee that every possible post-training scenario is considered, AFSOC feels that they have latched on to an excellent training system for their controllers.

Thomas Dorgan, a simulation specialist with the 23rd Special Tactics Squadron, (STS) Hurlburt Field, FL, is the subject matter expert on the air traffic control simulator being used by the AFSOC. According to Dorgan, the enhanced tower simulator (ETOS) used by STS replicates a control tower environment.

“Currently, the ETOS is used to train USAF Special Tactics combat controllers to safely and expeditiously move aircraft from, to and through designated airspace. The simulator provides controllers with the tools necessary to improve situational awareness, decision-making, effective communication and workload management,” he explained.

The simulator is manufactured by Adacel Inc. and is based on their MaxSim Tower product. According to Dorgan, the ATC system used at Hurlburt is a derivative of a system already in use for control tower training and by the U.S. Army for its technical school at Fort Rucker, AL.

“MaxSim’s advanced simulation of military aircraft movements and aircraft performance is developed to meet the demanding needs of the USAF and U.S. Army ATC training,” said Gary Pearson, Adacel’s director of products. “We’re ideally suited for a wide variety of military simulations throughout the U.S. armed forces. The automated and accurate movement of aircraft and vehicles is a core requirement for the simulation of the modern battlespace.”

MaxSim’s military experience has prepositioned the company to provide simulation training for special operations warfighters engaged in roles as diverse as tactical ATC, forward air control, close air support and call for fire. Adacel’s speech recognition system, when combined with advanced speech synthesis, environmental sound and high fidelity visual effects, provides realism that engages war fighters and transports them to a chaotic virtual world that is as realistic a world as possible.

“The synthetic environment is as close as is possible to the operational theater,” stated Pearson. The simulator is versatile enough to be operated by apprentice controllers, and team members may train individually or as integrated teams for contingencies worldwide.

Naturally, realistic training remains the goal of every simulation experience. But only in recent years has this been in the realm of possibility. The ATC virtual reality trainer goes farther than many in realizing that goal. “Enveloping the trainee into an environment that closely reproduces the stressful situations and pressures of war is a necessity for quality and productive training,” said Pearson. The better the training, the more realizable is the “ultimate aim of bringing the war-fighter safely home,” according to Pearson. The Adacel MaxSim ETOS provides a geo-specific, photo-textured representation of an airfield using high fidelity image generators. Using a rear projection system, the visual scene encompasses a 270-degree panoramic field of view depicting runways, taxiways, hangars, buildings, local geography, terrain and natural features. Specifications indicated that the field of view can be scrolled through the entire 360 degree spectrum.

The ETOS can run a trainee through its paces without a pilot operator. The machine provides the pilot counterparts for trainees. The MaxSim Speech product integrates a speech recognition engine (controller input) with text to speech (pilot response) technology.

Consequently, controller trainees can immediately begin training without priming, or "teaching," a voice system (an element endemic to legacy voice-recognition technologies). The ETOS provides realistic computer generated pilot voice responses. The ETOS integrates LINUX, Windows 2000 and Windows XP operating systems, according to program officials.

The AFSOC Special Tactics Air Traffic Control Simulator program procured the first generation control tower simulator in 1994. This simulator, known as the TowerPro, was produced by Wesson International and was fielded to three CONUS operational locations. Over time, according to program officials, the Wesson simulator became logistically unsupportable and technologically out-paced. The next generation of ETOS was procured to replace the Wesson TowerPro simulator at Hurlburt Field. Two TowerPro systems are still in use at McChord Air Force Base and Pope Air Force Base. These systems are slated for replacement in the near future.

Training time on the ETOS has been significantly reduced, compared to training times in the 1990s. According to Dorgan, local units began operating the simulator following three days of on-site training by Adacel. "Controllers who utilize the simulator for training only require general systems familiarization consisting of knobs and switches. That only takes only a matter of minutes," Dorgan stated.

When trainees come back from Air Force technical schools, they receive more advanced training on the ETOS. Dorgan explained, "The target population has already completed basic, and further training in the ETOS is core skill knowledge refresher and application.

"The new Special Tactics combat controller just out of the pipeline can be expected to enhance and improve his skills using the ETOS on a more frequent basis than other team members who have already gained operational experience. All Special Tactics combat controllers can be expected to use the simulator, so training is tailored to meet the range of requirements from apprentice to journeyman levels. Typical duration of a training event is 45-60 minutes."

### **When Getting a "D" is Extraordinary**

To understand the context in which Adacel MaxSim ETOS is being integrated into the overarching training regime at Hurlburt, a word must be said about Distributed Mission Operations (DMO), the successor to the Distributed Mission Training (DMT) concept, (see related KMI story, "Distributed Mission Training," KMI, Military Training Technology, Volume: 8, Issue: 4, November 2003). AFSOC has been considered among its earliest proponents. In 1999, General Ryan, Chief of Staff, Air Force, recognized AFSOC as the Air Force leader in DMO. During a distributed mission event called "Synthetic Theater of War," he stated, "The 19th Special Operations Squadron [SOS] is 10 years ahead of the rest of the Air Force."

In August 2000, the 19th SOS at Hurlburt led a first of its kind, multi-service DMO exercise that linked eight geographically separated simulators. ATC simulators complement DMO goals and have fit in well with the overarching concept.

Other elements of DMO that serve to complement the ETOS training include Virtual Joint Close Air Support, Special Operations Forces Signals Training and Rehearsal System, Blue Force Tracking and Time-Critical-Targeting, and the Visual Threat Recognition Avoidance Trainer.

Momentum for these initiatives is being sustained by Lieutenant Colonel Mike Plehn, commander of the 19th Special Operations Squadron. AFSOC hopes to "fuse" ground forces, air control and other virtual training into a cohesive whole to provide the best-trained people possible.

Among the most important goals for AFSOC is obtaining "Level-D" certification for its simulators. Level-D is a certification the FAA assigns to simulators they evaluate. This rating certifies that the fidelity (visual, audio, performance, feel, etc) of the simulator is such that it is possible to accomplish training events normally restricted to the aircraft.

"Airlines currently use commercial flight simulators for this type of training," said AFSOC program officials. "Additionally, the vast majority of C-17 training is done in the simulator and up to 80 percent of CV-22 training will be accomplished in a high-fidelity simulator. The challenge is providing a Level-D capability in a tactical environment. Because of the altitudes and missions we fly and the threats we encounter the database is much larger and more complex than used by commercial aviation."

Once AFSOC reached the Level-D certification for its simulators and obtains more of them at the upper-end of quality, the command plans to move even more training to the simulator. This will reduce reliance on its resources and reducing flying hour and temporary duty costs. With more realistic DMO training, aircrews will be able to get seasoned in the simulator and we may be able to reduce aircraft upgrade requirements.

Feedback from trainees has indicated a great deal of merit to the simulation training program, particularly in direct support of the global war on terrorism in Iraq. "Specifically, combat controllers who have been trained on this system deployed in support of Operation Iraqi Freedom and controlled some of the busiest airfields in the theater of operations without incident," noted Dorgan. Dorgan conceded that the current system doesn't train combat controllers on all facets of air to ground integration. "We are awaiting additional equipment that will provide our combat controllers the ability to train on close air support, as well as ATC," said Dorgan. Plainly, AFSOC is continuing in the right direction to integrate DMO and expand simulation training in terms of quality and quantity. If that's the evaluation of the troops, that's the real deal.