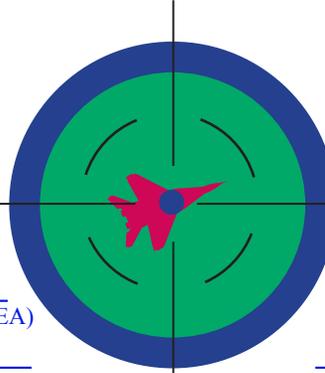


FIGHT'S ON!



Quarterly Newsletter from the Warfighter Training Research Division (AFRL/HEA)
of the Air Force Research Laboratory Human Effectiveness Directorate

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Nellis AFB — Home of the Fighter Pilot with AFRL/HEA as Wingman

AFRL/HEA scientists, engineers, and subject-matter experts (SME) have garnered solid support for Distributed Mission Training (DMT) at Nellis AFB, NV--Home of the Fighter Pilot. In addition to hosting fighter pilots for intense air-to-air DMT weeks at Mesa Research Site, AFRL/HEA is working to establish connectivity with command and control (C2) and other warfighter training nodes at Nellis. Among the fighter pilots and C2 experts that will attest to the value of high-fidelity simulation to augment live-fly readiness training are the USAF Weapons School (USAFWS) and the Advanced Weapons Director School (AWDS) of the 414th Combat Training Squadron, Warrior Preparation School.

During the week of 22 September, USAFWS pilots flew high-fidelity DMT scenarios as part of the current Weapons Instructor Course (WIC) Class 02B syllabus for F-16 students. With careful coordination among instructor pilots (IP) of the Viper Division at Nellis AFB and SMEs at Mesa, each currently enrolled WIC student flew five complex simulator missions controlled by AWDS students over the Nellis Range Complex database in the DMT Testbed. The five-sortie DMT syllabus was constructed to enable WIC students and IPs to fly against multi-bogey groups in preparation for the live-fly Air Combat Tactics/Tactical Intercepts Phase when the group returned to Nellis, and culminating with the final Weapons Phase.

Col Robin "Baba" Rand, USAFWS Commandant, and Lt Col Chuck "Nut" Corley, F-16 Division Commander, endorsed training at Mesa to supplement prepara-

tion for WIC spin-up training prior to reporting to Nellis, all confirmed the value of intense mission planning, briefing, execution, and debriefing opportunities as key preparation steps for the final phases of training at Nellis.

The week supporting the USAFWS was a watershed event. However, AFRL/HEA continues to work closely with other Nellis organizations to meld live, virtual, and constructive entities into the DMT arena to enhance the synthetic environment at Mesa and point the way towards Distributed Mission Operations (DMO). With ongoing collaboration between AFRL/HEA and Nellis, key capabilities within the 98th Range

Wing and Combined Air Operations Center (CAOC)-Nellis may soon be available to assimilate additional mission areas in the DMT Testbed. Mesa engineers, scientists, and SMEs anticipate flying DMT



USAFWS IPs Capt Todd "Rat" Murphey and Maj Chuck "Ogre" Blank with WIC Class 02B student Capt Chuck "Pyro" Podolak, recount their DMT experience after an air-to-air combat engagement at Mesa Research Site

tion for pilots selected to attend WIC. USAFWS leadership saw the training value afforded in the DMT Testbed was confirmed by noticeably improved student performance in a number of areas for pilots who trained with AFRL/HEA immediately prior to attending WIC. In early 2002, the USAFWS changed the F-16 syllabus to augment the course by deploying WIC Class 02A and subsequent WIC classes to Mesa.

Noting the "awesome" high-fidelity visuals, threat models, and missile fly-outs, "Baba" and "Nut" were impressed with the realistic training opportunity for the WIC IPs and students and asked "when can we get DMT at Nellis?" While nine of the ten WIC 02B students cycled through Mesa during summer 2002 DMT weeks



Lt Ben Dustman, 960th AACS (AWACS), controls missions on the WCS, recently integrated in Mesa's DMT Testbed

missions with live-feed Predator Uninhabited Aerial Vehicles video from the Nellis Range Complex, and receiving Air Tasking Orders (ATO) through CAOC-Nellis systems. Melding these capabilities raises the research horizon for Mesa to extend DMT domains to integrate Air, Space, C2, and Intelligence, Surveillance, and Reconnaissance (ISR) mission areas of the Combat Air Forces (CAF). Eventually, DMO will be an essential element of training for all Expeditionary Aerospace Force warfighters; it will be an integral part of the Air Expeditionary Force (AEF) training cycle.

To enable processing of feeds from the 98th Range Wing, Mesa recently replaced an older Block 20/25 Airborne Warning and Control System (AWACS) console with the Solipsys Tactical Display Framework (TDF)TM to serve as the next-generation C2 system in the DMT Testbed. Designated the Weapons Control Station (WCS) at Mesa, other TDF systems are now in use as the NORAD Contingency Suite and as the 98th Range Wing complex's replacement equipment for the Nellis Air Weapons Control System. Using the Multi-Source Correlator Tracker with the TDF systems, the Division anticipates the WCS will be able to display virtual and constructive missions in conjunction with live operations on the Nellis Range Complex. AFRL/HEA engineers are planning seamless connectivity for system operation between the Mesa synthetic environment and Nellis nodes. Scientists and SMEs are developing CAF training



Col "Baba" Rand and Lt Col "Nut" Corley flew and oversaw DMT sorties flown by USAFWS pilots at Mesa

research initiatives, strengthening DMT capabilities while advancing towards the goal of DMO.

Among the first controllers to use the WCS at Mesa, the AWDS group enthusiastically confirmed the graphical-user interface was a vast improvement over the outdated Block 20/25 AWACS interface, and the two screen displays allowed each instructor to closely monitor student performance. AWDS students and instructors represent air and ground-based controller communities, and while the systems have different interfaces, AFRL/HEA is researching the concept of C2 as a weapons system independent of associated system hardware.

During digital debriefings at Mesa, pilots and controllers were able to view the "god's eye" view, quad displays of each Viper's radar, radar warning receiver, head-up display repeater, and tactical awareness display, and will soon see the WCS replay on a separate screen. The capability to include C2 sensor fusion and display data will guarantee detailed analysis of every engagement from each participant's perspective, and also help AFRL/HEA scientists collect data on "team of teams" training.

AFRL/HEA is developing air-to-air Mission Essential Competencies (MEC) in collaboration with Air Combat Command (ACC), and integrating the WCS in the DMT Testbed will catalyze efforts to develop C2 MECs. MECs are those higher-order individual, team, and inter-team competencies that a fully prepared pilot, crew, or flight requires for successful mission completion under adverse conditions and in a non-permissive (hostile) environment. Mesa's Air Force Reservists are working with experts at Tinker AFB to broaden MECs developed for the AWACS community to apply across C2 platforms. Harmonized efforts with experts in the USAFWS/CCO Division and the AWDS



The CAOC at Prince Sultan Air Base features C2ISR displays common to most COAC facilities

at Nellis are integral to MEC development for the C2 mission--regardless of whether the system is airborne or ground-based.

Sharing research data between the Virtual Air Commander C2 testbed at Wright-Patterson AFB OH and Mesa's DMT Testbed, AFRL/HECP plans to use Mesa's training research analysis from the WCS to advance an embedded training capability for evolving C2 systems. AFRL/HEA's scientists and engineers will collect training research and technical data on improved controller interfaces based on feedback derived from C2 warfighters during training research scenarios at Mesa. This collaboration, building advocacy among warfighters and customers, and congruence among acquisition, application, and research organizations, can point the way towards future systems and user interfaces to increase the lethality of the critical C2 link in the "sensor-to-shooter" combat environment.

Supporting warfighters defending America's freedom is AFRL/HEA's number one mission. Nellis AFB is the center for warfighter tactics development, training and operational testing throughout the CAF. Team Mesa and Nellis are working closely together to lay the foundation to revolutionize AEF training in the Air Force's DMO journey.





Brig Gen (select) Phil "Bwana" Breedlove, 56th FW/CC (center) joins the Luke AFB IP four-ship led by Maj Bob "Bobaloo" Rickard (left) to evaluate B-Course training options available to AETC through the use of high fidelity simulation

Reservist Supports JEFX02 and Millennium Challenge

Lt Col Rick Glitz, AFRL/HEA Senior Reservist, performed liaison duty at Nellis AFB between the Fleet Battle Experiment-Juliet (FBE-J) and the Joint Expeditionary Force Experiment (JEFX) 02 in support of the burgeoning relationship between Reserve activities of the Office of Naval Research (ONR) and AFRL. These experiments are the Navy and Air Force components of Millennium Challenge 02, a congressionally mandated, biennial joint Service exercise.

Principal among mutual interests are efforts to synchronize the development of the ATO with the Maritime Tasking Order (MTO), AF implementation of the Automated Deep Operations Coordination System (ADOCS), the ISR Manager (ISR-M), and general progress and operations within CAOC-Nellis.

While the effort to synchronize the ATO and MTO made significant strides, continued effort is required for a truly joint tasking order. JEFX 02 players and assessors were pleased with the performance, utility, and interoperability of both ADOCS and ISR-M. During Millennium Challenge, the integration of live, virtual, and constructive systems helped assessors evaluate the operational impact of mission-related aspects of JEFX/FBE-J. As an outreach effort between Reserve components of AFRL and ONR, this mission was a success.



Distributed Training Network Guard

Increased DMT capabilities will enable warfighters to "train the way we fight" in a distributed, secure, high-fidelity, full mission training synthetic battlespace. Current simulation environments, however, limit training due to an inability to connect and operate in multiple security levels (MSL). The goal of "Distributed Training Network Guard (DTNG)," a Category I Advanced Technology Demonstration program, is to develop and demonstrate an MSL capability. This will enable High Level Architecture (HLA) federations to operate at different security levels and allow DMT systems to fully support mission readiness training and



Serving as a "digital traffic cop," the Trusted Bridge Federate (TBF) program within the computer network ensures the Distributed Training Network Guard (DTNG) enables simulation federations operating at different security classifications to operate in the DMT environment

rehearsal among warfighters assigned to various weapons systems normally employed during combat operations.

DTNG is comprised of two compatible components, the Trusted Bridge Federate (TBF) and a companion Security Reclassification Rule Set Intelligent Assistant Tool (SRRSIAT). The TBF is the physical real-time automated network guard component, a "digital traffic cop," supporting two-way data transfer between HLA simulation federations. The SRRSIAT is a stand-alone pre-mission graphical user interface application tool providing security and federation domain experts with the ability to develop and review reclassification rules.

This summer AFRL/HEA engineers and SMEs conducted a successful initial capabilities demonstration of the TBF operating in the networked HLA synthetic environment. Approximately 30 government and contractor support personnel gained a better understanding of TBF and SRRSIAT design, architecture, and functionality through a series of technical briefings and through realistic four-ship mission vignettes in Mesa's DMT Test-bed. The demonstration proved the great potential for the system to meet MSL requirements and revolutionize future DMT and DMO readiness training in joint synthetic battlespace exercises.



Gen Donald Cook, AETC/CC, Col Curtis Papke, AFRL/HEA Division Chief, and Brig Gen David Stringer, AETC/LG, review their DMT experience after discussing division support for AETC programs during a recent visit to the Mesa Research Site

Advanced Training Technology Needs for AETC Study

A study being conducted by AFRL/HEA at the request of Air Education and Training Command (AETC) seeks to assess the current state of flying training in AETC, and identify opportunities where advanced simulation technologies could increase the efficiency and effectiveness of the command's flying training, maintainer training, and leadership training programs.

AFRL/HEA scientists are in the final stages of analysis and documentation, but the initial results point to training effectiveness afforded by high fidelity cockpits (physical and functional), 360-degree visual systems with 20/20 visual acuity, networked simulators, and computer-generated interactive entities. These areas show the highest payoff in terms of solving the most deficient tasks reported by AETC instructor pilots. The report will assist AETC planners in development of a technology integration roadmap and offer a first look at potential targets of modern, high-fidelity training technology insertion to help:

- Reduce the number of busted check rides, washbacks, and washouts
- Train students to higher proficiency levels than previous course graduates
- Produce aviators who are more combat mission ready across a greater number of skills, tasks, and competencies

AFRL/HEA will deliver the final report to AETC at the end of October 2002.



TARGETS OF OPPORTUNITY

The Warfighter Skill Development and Training Research Branch hosted a **National Guard Space Operations Flight**, championed by AFSPC/DOTX as the primary Space Battle Management Core System (SBMCS) trainers for the CAF, during a DMT orientation and kick-off meeting at Mesa. The SBMCS will enable space operators to train and support the AOC in real-world contingencies from a common platform. The proposed collaboration with the Guard will inject space and space operations assets into the Mesa DMT Testbed, thus furthering CSAF's vision of DMO.

The **Mesa Police Department (PD)** engaged AFRL/HEA to help develop Night Vision Goggle (NVG) capabilities for their helicopter pilots and observers. Following familiarization missions during which airborne Mesa PD officers responded to dispatch calls while observers employed NVGs, both organizations agreed to collaborate with implementation of NVG training for the police air mission. Two Mesa PD officers enrolled in AFRL/HEA's NVG instructor course to begin building core expertise for the evolving training research program.

BRIEFS AND DEBRIEFS

AFRL/HEA representatives attended the **USAF DMT Integrated Product Team** working group at Orlando FL, the ACC-sponsored **Realistic Training Review Board** at Langley AFB VA, and the **USAF in Europe DMT** conference at the Warrior Preparation Center, Germany. At these venues, discussions confirmed that expanded DMT capabilities offer the surest means towards fully mission-capable DMO to augment AEF readiness training.

The AF Reserve Command commissioned an **A-10 Training Effectiveness Evaluation** study with AFRL/HEA, which will complement A-10 MEC development work supported by ASC/YWI. Team Mesa is also working MECs for the Suppression of Enemy Air Defenses mission and the Joint Surveillance Target Attack Radar System.



During a memorial ceremony in remembrance of 9/11/2001, Col Papke leads in rendering honors while the flag is placed at half-staff by a member of the Mesa Fire Department and the Mesa Research Site



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