

FIGHT'S N!

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Battle Over Iraq: World's First International Simulated Composite Air Operation

LtCol Mike Park, Research Operations Officer

"There I was..." It felt good again getting airborne in my mighty Viper over the sandy desert of Kuwait, heading North with three of my buds into Iraq to put some hurt on a chemical research facility with six MK-82s each.

The weather was perfect for our mission. The 0630 launch went without a hitch, all 18 aircraft in my package slipped into the cool morning skies. In the US package, we had our four bomb-dropping Vipers, F-16 Harm shooters, and an EA-6. Joining our four-ship of F-16s was eight of our British friends flying four Royal Air Force (RAF) F-3 Tornados and four Jaguars.

I got our four-ship ready for battle, all pilots meticulously going over the switches in their cockpits to make sure they were ready to defend against Iraqi surface-to-air missiles (SAM) and heavy anti-aircraft artillery (AAA) fire. Our Advanced Medium Range Anti-Aircraft Missile (AMRAAM) and AIM-9M missiles were readied in case any MiGs were fool enough to cross our path. Bombs were checked so they did their job when released 15,000' above the bad guys

working at the chemical facility in their haste to deliver deadly chemicals via SCUD missiles.

The coalition flight formations were beautiful as we pushed into Iraq. AWACS was calling the air-to-air picture clean and we encountered only moderate AAA bursting off my left wing in big black puffs, which we easily defeated

SA-6 SAM targeted one of us and burned brilliant as it streaked through the sky. My wingman and I maneuvered our jets and narrowly avoided the large explosion just behind our aircraft. As he pulled up along my side, I commanded us to jettison our external stores, for it was time to push the mach and head back to the house. I heard

the Tornados engaging MiGs trapped at our six o'clock, and felt comfortable that our British friends had the situation under control. Yup, it was good to be back!

It had been four years since my last adventure protecting our nation's interests and the memories came back during this, the world's first international simulated composite air

operation (COMAO), 7-8 November 2001. The RAF weapons school was teaching new instructors how to plan and fight a full-scale air battle in the robust synthetic environment of Distributed Mission Training (DMT). A lot of hard work by a lot of smart people allowed the UK and the US to mission plan, brief, execute the COMAO, and debrief in real time. Networked



LtCol Mike "Odie" Park, Viper 41, briefs mission details to his F-16 flight members (Viper 42, 43, and 44) in Mesa's digital brief/debrief facility; Viper 41 flight flew as integrated four-ship within the synthetic COMAO force package led by RAF Weapons School students.

by maneuvering my flight to the right. As we approached the target area, AWACS started calling out MiGs to the northwest, but it was too late to stop us as I rolled in and dropped my load on the unsuspecting chemical site. I looked over my shoulder, straining against six Gs, and saw my wingman's bombs find their mark--a huge fireball erupted in the middle of the site. Just then, an

computers, cameras, and microphones allowed British and American intelligence officers and mission pilots to develop the plan, execute it in the simulators, and pull out lessons learned in debrief - making all of us better warfighters. From our perspective, we could see all terrain features, other aircraft in this COMAO, pick them up on radar, and communicate with RAF fighters and AWACS as the package went about our business over Iraq. Adding to the realism of this large-force exercise (LFE), computer-generated forces (CGF) of Red and Blue air were quite active, as missiles flew through the sky and AAA burst all around. This international synthetic COMAO proved long-haul DMT can make invaluable realistic mission readiness training possible for the warfighter – and it's fun, too!

COMAO Highlights

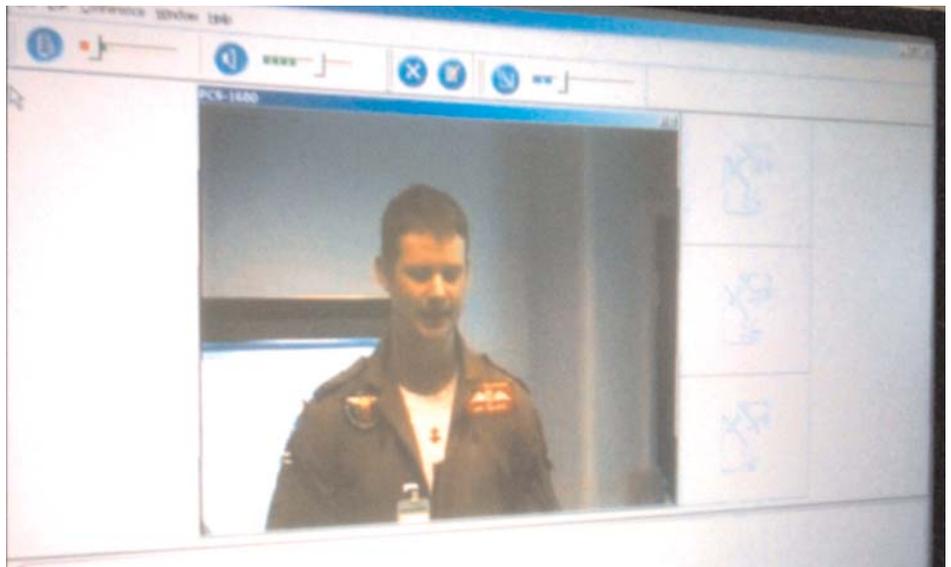
Jeff Carr, Simulation Technologies, Inc., AFRL/HEA

Sponsored by UK Ministry of Defense and enabled by The Technical Cooperation Panel's international training research and development (R&D) program, this synthetic COMAO focused on front-line warfighters from the RAF and the USAF. Linked to mission simulators at RAF Bedford, the Air Force Research Laboratory's Warfighter Training Research Division at Mesa AZ (AFRL/HEA), participated in the British-led LFE with the UK's QinetiQ technology, test, and evaluation arm of what was the larger part of the former Defense Evaluation and Research Agency.

DMT testing and integration across a transatlantic link began months before the LFE, with scientists and engineers at both R&D organizations working to solve technical details, identify training objectives, and obtain approval for this first-ever international event. Aircrew manned a total of 14 simulators (12 Blue air and 2 Red air) and planned, flew, and debriefed each day's mission in real time. With the focus on warfighter planning and performance in QinetiQ's networked simulators, AFRL/HEA sent training, networking, and air combat



Ian Mack, Canadian DMT R&D Project Manager, Ed Mayo, QinetiQ liaison, and LtCol Mike Park, AFRL/HEA Research Operations Officer, in pre-mission planning session at Mesa Research Site AZ for US/UK synthetic COMAO (observed by CA).



View of RAF Mission Commander at QinetiQ simulation facility briefing COMAO warfighters located on-site at RAF Bedford and at Mesa; sites connected via interactive Smartboards™ and video-teleconferencing systems for package briefs/debriefs.

experts to RAF Bedford while QinetiQ sent their expert to Mesa as on-site liaison. The Air Tasking Order was generated in the UK and key Mesa personnel met each morning at 0100 local time to participate in visual and audio interactive planning sessions with the mission commander at RAF Bedford.

While by no means technologically perfect, this COMAO trial was a resounding success from the warfighter's perspective due to real time mission planning, briefing, execution, and debriefing very similar to live-fly COMAOs. With several technical

improvements to enhance networked "face-to-face" communication between international warfighters, real-time mission preparation and reconstruction will come very close to the on-site interaction seen during Red Flag LFEs at Nellis AFB NV. A Fall 2002 COMAO is in the planning stages and will feature more realistic CGFs, enhanced mission planning capabilities, and dynamic command and control during scenario execution. Due to this successful first trial, R&D leaders in the US and UK are working to expand future COMAOs to include Canadian and Australian training R&D nodes into future DMT exercises.



Targets of Opportunity

Captain David Rodriguez briefed **Aerospace Operations Center** warfighters on initial AFRL/HEA training research initiatives for the Spiral Development Integrated Product Team at Langley AFB VA. **Aerospace Command and Control, Intelligence, Surveillance, and Reconnaissance Center** and **Air Combat Command** C2 experts supported initial plans and will foster access to subject-matter experts. Follow-on meetings at Hurlburt Field FL encompassed efforts of C2 Technology Innovation Group and C2 Warrior School (C2WS) representatives to integrate AFRL/HEA expertise in competency-based training and apply technologies and methods to C2WS training programs.

Dr. Brenda Wenzel met with **Arizona State University East Campus** scientists to discuss revisions specific to the needs of team knowledge assessment to be implemented in the Pathfinder program used in the assessment of pilot knowledge structures in the DMT Testbed. Dr. Wenzel also attended the **Globalization of Arizona E-Learning** launch to explore collaborative relationships with academia and industry interested in creating an Advanced Distributed Learning laboratory.

Captain Steve Polliard is in the 18th month of leading a 36-month Trusted Computer Solution, Inc., effort to develop both a Trusted Bridge Federate and a companion Security Reclassification Rule Set Intelligence Assistant Tool for distributed simulation within a High Level Architecture environment. This **collaborative R&D project between AFRL/HEA and AFRL/IFS** is an Advanced Technology Demonstration effort to develop a Multilevel Security guard for DMT Air, with a DMT Concept of Operations

planned to detail operation of this technology within a DMT network.

US Navy (NAVAIR) and **Army** representatives visited AFRL/HEA to discuss integration of the Night Vision Training System (NVTS) with sister-Service simulation training programs. The Army team is exploring NVTS applications in support of the CH-47F simulation program, and the NAVAIR team is interested in application of NVTS to improve F/A-18 flight simulators at Patuxent River MD. Further, RDML Richardson, USN resource sponsor for air, ground, and technical training activities, led a team of staff officers for a day of orientation and confirmed the Navy's program for DMT systems is on a fast-track to meet the Chief of Naval Operations vision. AFRL/HEA engineers and scientists discussed collaborative efforts to ensure program success.

As a featured speaker at the **Space and Missile Systems Center**, Captain Chris Biegun briefed and demonstrated a key component of the DMT-Space R&D program, the innovative PC-based Satellite Operations Simulator (SOPsim), a first ever system-selectable space operations trainer that is scalable to a given training environment. Utilizing high fidelity visual representation and an astrodynamically correct model serving as the engine for the simulation, SOPsim brings to the space operator a never before available visually and astrodynamically correct

space operations mission training and rehearsal tool. Leveraging DMT technologies, space operations can now be trained from the individual operator, entire console crews, or up to and including an entire Space Operations Center (SOC). Historically, live mission space systems were burdened with recurring on-the-job training requirements. SOPsim eliminates risks associated with tasking live systems for training missions, takes training "off line" to a robust synthetic environment, removes billion-dollar mission platforms from the process, and preserves high-value assets for real-world use. SOPsim can now train operators on traditionally high-risk satellite maneuvers in the low-risk environment of high fidelity simulation, and develop operator proficiency without waiting several years for "experience opportunities" to happen. SOPsim accelerates this proficiency curve by enabling space operators to deliberately "create experience opportunities" and design integrated simulation training programs to maximize development of critical operational skills. Coupled with the first-ever visualization of satellite operations, SOPsim significantly enhances skills transfer of training for operators. SOPsim represents a revolutionary expansion in space operations training capabilities by melding affordable high-fidelity simulation with complex high-payoff operational mission needs.



Astronaut (Colonel, USAF) Scott Horowitz, previously assigned to the Mesa Research Site, met with AFRL/HEA scientists and engineers during a NASA T-38 stopover flight to the Williams Gateway Airport.

Arizona elected officials from Maricopa County (Supervisor, District 1), Mayors of City of Mesa and Town of Gilbert, and staff members representing Congressmen J. D. Hayworth (R-AZ06) and Bob Stump (R-AZ03), visited the Mesa Research Site, 16 October 01.



Briefs and Debriefs

2Lt Bernard Almoite continued work on the missile flyout project, modeling aerodynamic performance of air-to-air missile capabilities of non-US countries for The Next Threat System (TNIS) database, which represents threat systems used in the DMT Testbed F-16 simulators. By taking missile performance data, documented by the National Air Intelligence Center, and modeling aerodynamic capabilities such as acceleration, velocity, and fuel mass flow rate, AFRL/HEA engineers enter resulting values into the TNIS database. The focus of this effort evolved from Russian missiles, i.e., AA-10a Alamo and AA-11 Archer, to some of the European missiles, such as the Advanced Short Range Air-to-Air Missile of Great Britain and the MICA (Missile d'Interception, de Combat et d'Autodéfense) of France.

Ms. Anna Castillo, Dr. Brenda Wenzel, and Dr. Wink Bennett, along with researchers from Arizona

State University-East Campus, are developing a new methodology for assessing the knowledge and understanding of Air Force pilots who come to Mesa for training research purposes. The methodology, called the Air Combat Skills Knowledge Assessment System (ASKAS), is a multimedia measurement tool using actual combat mission vignettes to identify combat tactics knowledge, mental "picture building" skills, and situational awareness abilities of pilots participating in DMT weeks at Mesa. ASKAS work is preliminary, but feedback on early assessment prototypes has been encouraging and the information derived will be used to refine DMT scenarios designed to enhance critical mission essential competencies.

Ms. Teri Jackson (AFRL/HEAI branch at Brooks AFB TX) was accepted to the Alamo Federal Executive Board Leadership Program, a nine-month training program designed to prepare leaders for federal community duty, locally and nationwide.

Dr. Wink Bennett and Major (Ph.D.) Terence Andre were elected to serve on the editorial board of the *Journal of Military Psychology*, a prestigious peer-reviewed publication and major scientific venue for military researchers to publish their work in mainstream periodicals. Serving on the board is a significant achievement and recognizes the reputation of Mesa researchers within the military and civilian psychological research communities.

Dr. Dee Andrews, Dr. Byron Pierce, and Dr. Wink Bennett were named National Research Council (NRC) Advisors, earning laudatory notice for their ongoing R&D excellence. NRC advisors help promote the application of cutting-edge research principles and technologies by soliciting and sponsoring creative research proposals from the academic community to meet real-world warfighter training needs.



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