

CAF DMO Training: A Paradigm Shift in Accomplishing DMO

Lt Col Robert Martin
132 FW, Det 1
DTCO, Des Moines ANG, IA
RMartin@airdmt.net

Walter Johnson, Santa Barbara Applied Research
Headquarters Air Combat Command
Langley AFB, VA
Walter.Johnson.ctr@Langley.af.mil

ABSTRACT

Over a decade ago, Air Combat Command (ACC) recognized Distributed Mission Operations (DMO) could be an invaluable training tool. Until a few years ago though, DMO usage languished and failed to realize the full potential that seemed so clear on paper. In some cases, the simulator technology itself was to blame. Likewise, some warfighters were initially hesitant to embrace DMO, fearing it would inevitably reduce their live fly training time. However, despite the continuous improvements in technology and the grudging acknowledgement that flying hour cuts were a looming reality, DMO still failed to take hold.

ACC eventually realized the problem was not with DMO as much as it was with the training model that ACC was trying to package DMO within. ACC had initially envisioned DMO operating somewhat like a pick-up game of basketball. ACC would provide the court—in this case, the network and simulators—and multiple units would independently connect to conduct a training event. Although this model brought together different platforms within the same event, it did not provide them the training they demanded. In short, no warfighter wanted to participate in DMO if they perceived they were training aids.

In response, ACC turned to the concept of “manned constructive,” a dedicated white force cadre trained to replicate any weapon system or agency. These manned constructives took on the role of the training aid, freeing the warfighters to focus on their individualized training objectives.

This paper documents ACC’s struggle to promote DMO, its paradigm shift over the last decade, and analyzes how the manned constructive concept is a critical component of a successful DMO program, and how it complements ACC’s new model of daily, small-scale DMO training. The results are striking: DMO usage is soaring...now is the time to capture the painful journey of this success story.

ABOUT THE AUTHORS

Lt Col Robert “Sticks” Martin is the commander of the Distributed Training Operations Center (DTCO). He is responsible for 19 military and 28 contractor personnel conducting over 1700 DMO events per year. He is an F-16 Instructor Pilot with over 800 hours in the Viper. He was active duty Air Force for 14 years where he attended the USAF Weapons school, had two tours in the Test and Evaluation community, and accumulated over 2000 hours in the F-15C.

Walt Johnson is employed by Santa Barbara Applied Research in Ventura, CA as an Air-to-Ground Fighter Analyst to the Air Combat Command (ACC) DMO program. His primary responsibilities are DMO training and training integration issues to improve the overall training capabilities of CAF warfighters. He previously served over 20 years as an A/OA-10 Instructor/Evaluator Pilot in the Air Force.

CAF DMO Training: A Paradigm Shift in Accomplishing DMO

Lt Col Robert Martin
132 FW, Det 1
DTCO, Des Moines ANG, IA
RMartin@airdmt.net

Walter Johnson, Santa Barbara Applied Research
Headquarters Air Combat Command
Langley AFB, VA
Walter.Johnson.ctr@Langley.af.mil

INTRODUCTION

The ability to sustain high levels of training in preparation for combat operations across all Combat Air Force (CAF) platforms remains a challenge, especially in today's environment of increased deployments, reduced flying hours, range limitations, and geographically separated units. The challenge for commanders at all levels from the Major Command (MAJCOM) Generals to the squadron leadership, is to provide a balance between the various training mediums, the time required and available to train in these mediums, and the effectiveness of each mode to enable the unit to conduct successful combat operations. One method currently being used to maintain high levels of readiness—and use the “train like we fight” experience—is through Distributed Mission Operations (DMO).

CAF DMO, formally known as Distributed Mission Training (DMT), is designed to provide warfighters with individual, team training, and mission rehearsal capabilities using advanced simulators, simulations, and real-world systems networked together to form a distributed synthetic battlespace. In simpler terms, DMO training is designed to enable warfighters to practice their high-end individual, team and inter-team combat skills on a daily basis.

Over a decade ago, Air Combat Command (ACC) recognized that DMO could be an invaluable training tool. However, until 2007, DMO usage languished and failed to realize the full potential that had previously seemed so clear on paper. There were many potential causes for the initial resistance. In some cases, the simulator technology itself was to blame. This was especially true in the early days of DMO before a well-accepted standards process had been embraced. Likewise, many weapon systems had not invested sufficient time and money into their simulator programs. In contrast, some warfighters were hesitant to embrace DMO, fearing it would inevitably reduce their live fly training time. For these individuals, DMO was a potential threat to their flying budget, and they were hesitant to invest money into a technology that

may later strip them of live-fly training time. However, despite the constant improvements in technology and the grudging acknowledgement that flying hour cuts were a looming reality, DMO failed to take hold.

ACC soon realized that DMO itself was not necessarily the problem; rather the problem was the training model that ACC was trying to package DMO within. ACC had initially envisioned DMO operating similarly to a pick-up game of basketball. ACC would provide the court—in this case, the network and simulators—and multiple units would independently connect to conduct a training event. However, while this model brought together different platforms, it could not provide each the training they demanded within the same event. In short, no warfighter wanted to participate in DMO if they perceived they were training aids.

As ACC looked at the issues hindering DMO training, it quickly discovered the main cause was the lack of an organization to handle the mission planning and white force support for event execution. There were several options to solving this dilemma, some of which already existed. One solution was to create an ACC group to host all mission preparation and execution issues required for successful mission completion. A second option was to look at existing organizations like the Distributed Mission Operations Center (DMOC) in Kirtland NM, or the Air National Guard's (ANG) Distributed Training Operations Center (DTCO) in Des Moines IA.

In both cases, ACC turned to the concept of the ‘manned constructive’ as an integral part of the overall solution to increasing the quantity and quality of DMO training being accomplished within the CAF. These manned constructives, a dedicated white force cadre trained to replicate any weapon system or agency, took on the role of the training aid, freeing the warfighters to focus on their individualized training objectives. The results have been striking as DMO usage, and the quality of that training, has improved dramatically over the last two years.

PURPOSE

This paper documents ACC's struggle to promote DMO, its paradigm shift over the last decade, and analyzes how the manned constructive concept is a critical component of a successful DMO program, and how it complements ACC's model of daily, small-scale DMO training. The results are striking: DMO usage is soaring. Throughout the paper, specific lessons that have been learned over the past decade will be highlighted. Many of these lessons are applicable even today, and are not unique to just DMO.

THE CAF DMO PROGRAM

The CAF began distributed training in the late 1990's and to date has over 30 different sites with 10 platforms connected for daily inter-team training with a goal of connecting at least six more platforms in the next few years (the ANG and Reserves have 50+ sites connected via the ARCNet that can also connect to the

CAF via the DTOC in Des Moines). In 2003 distributed training totaled approximately 300 hours and was mostly conducted between the E-3 Airborne Warning and Control System (AWACS) and F-15C platforms.

In 2009, over 10,000 training hours were accomplished in the DMO environment which included both air-to-air and air-to-ground training, as well as command and control missions involving a mix of striker (fighter/bombers) and Command, Control, Intelligence, Surveillance, and Reconnaissance (C2ISR) platforms.

CAF DMO is used by the warfighter to train at the tactical, operational and strategic levels. The primary focus however is on unit-level, mission proficiency training utilizing local, short-haul connectivity followed by combat mission training involving shooter-sensor small team training using long-haul connectivity (e.g. F-15C/ AWACS, A-10/JTAC, B-1/JSTARS). Figure 1 illustrates the current and future locations of DMO capable systems within the CAF.

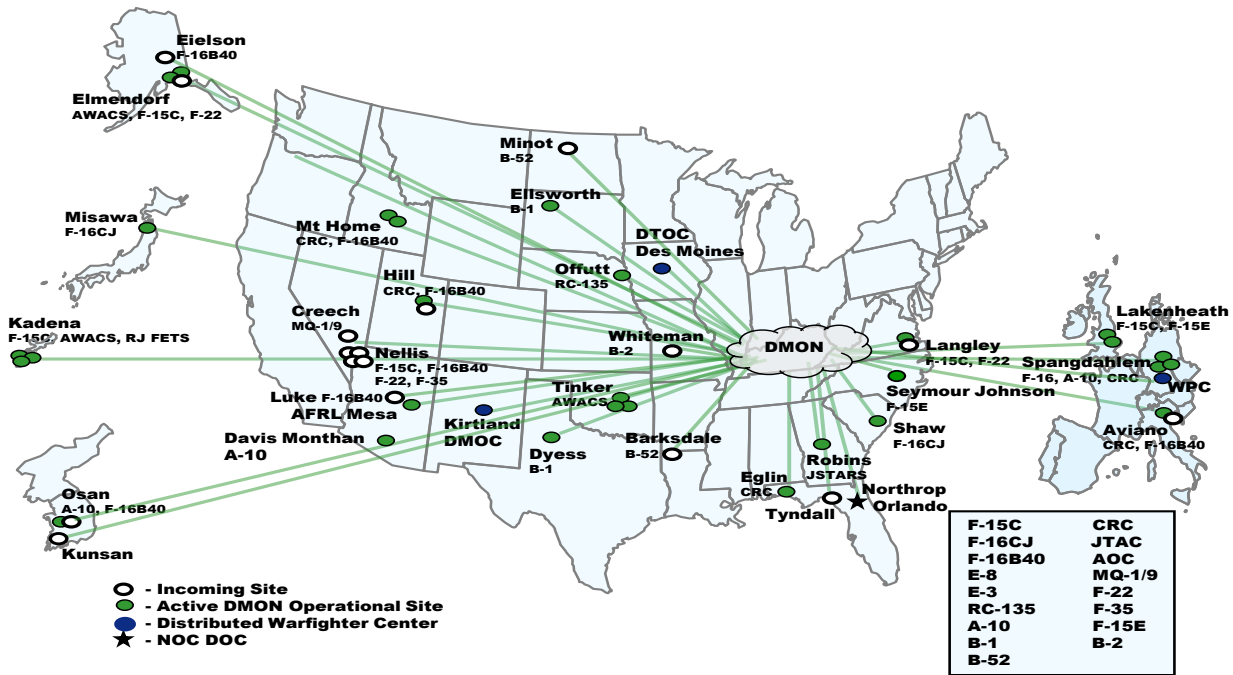


Figure 1. CAF DMO Sites

Successful Features of CAF DMO

ACC focused on several factors necessary to make distributed training a feasible option for accomplishing combat training in simulators to augment live-fly training on a daily basis. First, high fidelity simulators

with a distributive debriefing capability to capture lessons-learned are required to provide an immersive environment to the operators. Second, is the use of a persistent, hub-less network and a standards process that eliminates the need to accomplish integration testing for each new training team combination.

Standards Process

The CAF DMO Operational Requirements Document states that “DMT will provide a realistic, full spectrum combat training system for combat-coded aircraft and aircrews. DoD/industry standards for interoperability are the key concept to implementing DMT as envisioned by senior AF leadership to allow the space and air team to train and exercise together--as they will fight.” (Operational Requirements Document (ORD) CAF (USAF) 009-93-I-A for Distributed Mission Training 8 Oct 97).

CAF DMO training systems are a combination of new and legacy systems developed over several decades and are designed by numerous different contractors and subcontractors. These two realities result in disparate systems that do not have a plug-and-play capability nor guarantee interoperability from either a technical or training perspective. The task of ensuring connectivity between sites is a difficult and extensive process.

The objective of a strict standards process is to facilitate daily training between varying sites without necessitating repeated integration testing. The interoperability standards apply to all systems participating in CAF DMO events on the DMON, to

include systems outside the DMO Network that link routinely to the DMON (e.g. an ANG or Reserve A-10 Full Mission Trainer (FMT) connecting to other CAF DMO platforms via the ARCNet to the DMON) (Aldinger & Keen, 2007).

As a whole, the set of standards is intended to ensure a routine, interoperable, distributed, simulated battle-training environment. (CAF DMO Standards Website).

The goal of these main features of CAF DMO was to provide a transparent environment desired by operators for distributed training. Figure 2 illustrates the number of training hours and events accomplished over the DMO Network from 2003 through 2009. Engineering and testing hours were not accounted for in this chart. The chart shows that the proportional increase in hours in the number of distributed events involving more than one site.

Although the statistics reflected that the number of both events and training hours had increased over the last decade, it also showed an apparent leveling off since CY 08. ACC had met its goal of providing a viable training medium to conduct high fidelity distributed training. What it had not accomplished was demonstrating the value of this capability to all of the CAF DMO weapon systems.

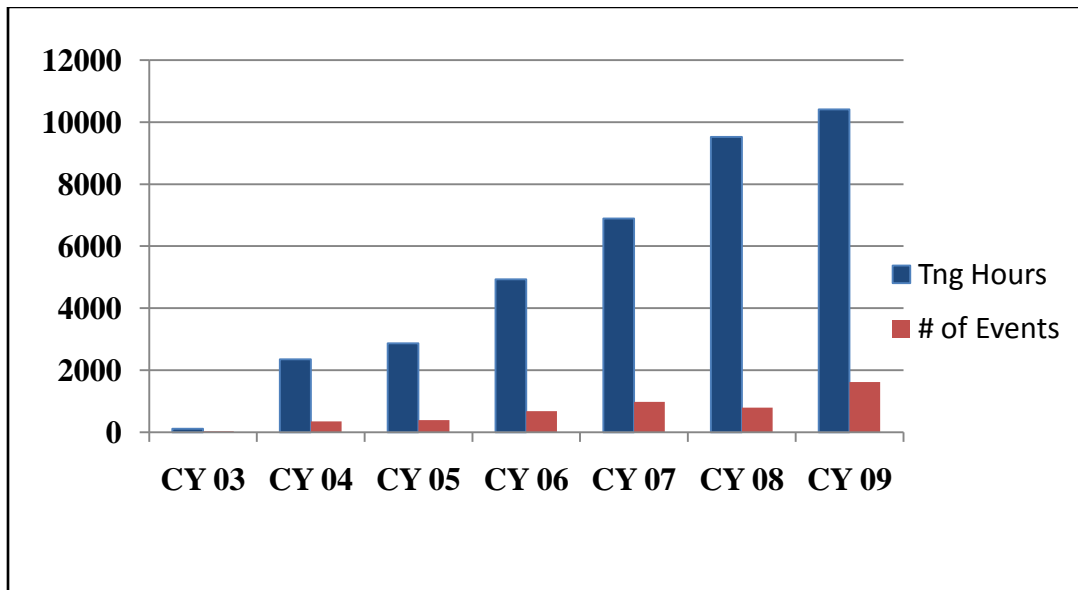


Figure 2. DMON Training Hours and Mission

In an effort to determine the root cause in the lack of DMO participation, the ACC staff queried numerous sites, both those utilizing and not utilizing DMO on a routine basis. The groups appeared to be easily distinguishable. Those utilizing DMO training were primarily C2ISR systems that derived extensive training value out of a dedicated white force. Those not fully utilizing DMO mainly fell into a group comprised of 4th Generation fighters, F-15E and F-16s, as well as F-15Cs. The first two platforms are multi-role (air-to-air and air-to-ground) weapon systems with a requirement to train in multiple missions.

When the staff dug deeper, it became apparent that the high operational tempo of these units left the warfighters little to no time to effectively plan for a detailed simulator mission, develop all the mission planning materials, and determine white force requirements for use during the event. The units were looking to ACC to provide this capability for them. In essence, operators wanted to show up to the simulator facility and have a training capability handed to them. Since ACC did not yet have such an organization, it requested this support from the DTOC.

THE ANG DTOC

The DTOC was established by the Air National Guard to provide a low cost, efficient solution to meet the ANG's DMO requirements. It provides small scale, tactical level training opportunities to warfighters across the globe. Its low cost connectivity solution, combined with a cadre of dedicated white force SMEs (subject matter experts) acting as "training aides" provided a unique, persistent training capability that could be leveraged to meet a unit's daily DMO training requirements.

The DTOC reached IOC (Initial Operating Capability) in 2003, initially focusing on providing DMO support to the Air National Guard, the Air Force Reserves, and elements of the Homeland Defense. The DTOC was designed to specifically cater to the unique needs of the Guard and Reserve warfighter, a construct that would later prove to be popular with active-duty units as well.

Traditional Guard and Reserve pilots are often only on-base once or twice a week, and even then usually only long enough to brief, fly, and debrief. While on this 4-hour drill status, the pilots are expected to fly, as well as accomplish a myriad of primary and ancillary training requirements. They simply did not have the time, or desire, to spend this limited time mission planning, listening to an extended pre-mission brief, or participating in a lengthy DMO event plagued by

technical issues or dead-time. Complicating the problem was the fact that for many pilots the simulator was a necessary evil. The simulators were used solely for required instrument or Emergency Procedures (EPEs), not for tactical combat training. For many pilots, the last thing they wanted to do was spend *more* time in the simulator.

In short, both ACC and the DTOC faced an uphill battle in their push to expand DMO throughout the CAF. Understanding this resistance, the DTOC approached every DMO event with the following perspective: it only takes one bad event to sour an entire squadron on the value of DMO. As a result, the DTOC took specific steps to maximize the training value of each DMO event. By focusing entirely on the training objectives of the warfighter, the DTOC was able to develop a system for implementing small-scale, tactical DMO on a daily basis. This form of DMO has proven enormously popular with the warfighter, and has been expanded and incorporated into the active-duty component through ACC. The lessons learned by ACC through its work with the DTOC have allowed it to revamp its DMO program over the last two years. Not only are these lessons learned important in order to understand the transformation of ACC's DMO program, but they are also potentially applicable for any training program looking to incorporate modeling and simulation technology.

Lesson 1

Need for a trained white force

First, the DTOC developed a cadre of qualified white force personnel. This white force was selected in order to ensure that a variety of military skill sets were represented. When the DTOC began, there were only a few units within the Guard and Reserves that had a DMO capability. Thus, it knew that it would not be able to simply connect various platforms and let them train. Rather, the white force cadre would have to role-play any agency, person, and weapon system that was needed in order to satisfy the warfighters' training needs. It was also important that these individuals come from a training background. As the event progressed, the white force leveraged their own training backgrounds and experience in order to ramp up or ramp down the intensity of the event according to the proficiency of the individual warfighter. Finally, the white force cadre needed to have a solid understanding of the capabilities and limitations of the simulator technology itself. These three attributes allowed the white force to understand a warfighters'

training requirements and then translate those objectives into a DMO-suitable training event.

Lesson 2

Need for short, high-intensity training events that are objective-driven

Second, the events were limited to roughly 60-90 minutes from beginning to end. This included a short pre-mission brief that was primarily tactical in nature, as well as a short debrief that focused on tactical lessons learned and any insight as to how the event could be made better. Although some events and airframes require longer missions, the 60-90 minute window worked well for the vast majority of events. Not only did the compressed time frame help ensure that the warfighter was kept engaged for the entire event, it also forced the white force to identify the primary training objectives and then develop a scenario that was specifically designed to elicit the proper training.

Lesson 3

Limit the "busy-work" for the warfighter

Third, the DTOC made the decision to take sole responsibility for the mission planning, mission material creation, and white force event execution. The DTOC would always attempt to make contact with the unit prior to the event. However, in many cases the first time the DTOC would be able to talk to the pilot would be the day of the event, often over the radio right before stepping into the simulator. In most cases the pilot would not really understand what DMO could and could not accomplish. Similarly, the proposed training objectives might be extremely vague. For example, a pilot may request something as simple as "I would like to do some Close Air Support (CAS)." In those instances, the DTOC needed to have a variety of different training events available at a moment's notice. Moreover, the nature of CAS itself requires a high degree of flexibility and the ability to respond to what the pilot does.

As a result, the DTOC developed a series of basic shells that reflected a variety of generic missions. For example, several Korean scenarios were built, as well as scenarios in Iraq and Afghanistan. For each of these scenarios a basic set of mission materials would

usually be produced. These mission materials were similar to what the warfighter would receive prior to any mission. Likewise, the DTOC would prepare a three to five minute pre-mission briefing that reflected the type of brief they would normally receive within their unit. After that, the warfighter simply got into the simulator and was ready for a "fight's on" call. In some instances, additional mission planning was requested from the unit itself. Likewise, in some cases, the training itself may involve learning how to mission plan. However, it is important to recognize the difference between valuable mission planning and mere busy work.

Lesson 4

Events do not have to be large or complex to be effective

It is worth noting that a "built" scenario often merely included ten to fifteen entities. This was initially due to the fact that the A-10 FMT had a visual system limitation that precluded the use of more than thirty entities in a specific geographic area. The real driving force, however, behind the limited number of entities was that the true value of the DMO scenario came from the white force cadre and the flexibility they offered. These scenarios were not the type where you could simply press "play." The very nature of CAS required the DTOC to rely less on the threat generator and more on the human component. Likewise, for air-to-air events, the white force pilots needed the ability to maneuver as they would in the real-world. This need for flexibility drove the DTOC to pursue a responsive and easy-to-use threat generator that could be quickly manipulated by the white force on a real-time basis. No longer were warfighters satisfied with simply continually strafing a convoy as it headed out across the desert, not changing course or even responding to the aircraft overhead. CAS, and especially urban CAS, is inherently dynamic, and the white force cadre often would normally not know how an event would transpire until it actually played out.

While the value of a quality threat generator should not be discounted, it is important to remember that the most important component of the event was the white force person on the radio role-playing as the training aid. The threat generator is merely a tool for the white force to inject themselves into the battlespace. The white force former pilot becomes the Su-27s fighting the blue-air 4-ship; the white force former Army personnel are the insurgents as they ambush an

unsuspecting convoy and then try to slip away before CAS arrives; and the former white force JTAC is on the ground getting shot at. This immersion generated a new term coined “manned constructive.” No longer is the threat generator simply the product of the computer programming; it becomes an extension of the white force and thus is all the more effective as a training tool.

Lesson 5

The “pick-up game” construct is incompatible with most DMO

As late as 2006, the DTOC primarily serviced a handful of sites. It worked with all the Guard and Reserve A-10 units, as well as a combat controller squadron out of Louisville. The DTOC initially envisioned a paradigm similar to the one ACC had developed. Much like a pick-up game of basketball, the DTOC believed that if it provided the court (the network), then the players (the unit simulators) would be able to show up and start playing. Initially the pick-up game was not feasible for one simple reason—there were not enough players to field complete teams. As a result, the DTOC was left to backfill the empty spots; thus the need for a white force cadre to role-play the agencies and weapon systems required to complete the battlespace.

As time went on, the value of the white force became unmistakable. Although the value of the white force was well recognized, the DTOC still envisioned that eventually the demand for the white force would plateau and perhaps even diminish once additional units were connected and able to participate. Thus, as the thinking went, once a real Joint Terminal Attack Controller could participate, the DTOC would need one less white force body to role-play that individual. A similar reduction would occur as more and more units came on-line. In the end, the DTOC white force could simply monitor the event and provide limited role-playing support as required. However, this did not turn out to be the case. Indeed, the exact opposite occurred. The DTOC discovered that adding a new participant often required an exponential increase in the amount of mission planning and white force support. In addition, the DTOC encountered a variety of other problems.

For example, the envisioned “pick-up game” model did not materialize. When people show up for a pick-up game of basketball, everyone knows what they are

getting—they are there to play basketball. No one in their right mind would show up at a playground and, when their team had ‘next,’ say that they wanted the game to focus on ball-handling and passing, and thus there would be no shooting. That, however, was exactly what would happen in a typical DMO event involving disparate platforms. One unit would show up hoping to focus on working convoy escort. Another unit would request Type 1 controls utilizing target talk-on with the targeting pod. And finally, a third unit would be interested more in airspace de-confliction and did not necessarily care if a single bomb was dropped. They were all there for a CAS mission, but their specific training objectives varied greatly. There were only four options available in this situation:

- 1) dictate to the units what the event would entail and ask them to modify their training objectives;
- 2) ask each unit to serve as a training aid to the other at some point in the event in order to satisfy everyone’s requirements;
- 3) develop a “perfect” scenario that was designed so that each and every participant received the training they needed; or
- 4) expand the number of white force personnel in order to ensure everyone received the proper attention.

The first two options were non-starters. Each individual unit and warfighter has specific training requirements and it was unfair and impractical to ask them to sacrifice their training. Likewise, a surefire way to turn the warfighter off to the idea of DMO was to make it seem that they were simply being a training aid for another unit. Now, this is not to say that units do not, and should not, help each other. However, there is a distinct difference in a pilot spending five minutes in a CAS stack to help a JTAC provide airspace de-confliction, and asking that same pilot to spend **all** but 5 minutes in that same CAS stack.

In this same vein, option three appears to be a feasible solution, but is much better on paper than in reality. Not only is the “perfect scenario” often unobtainable, it requires a significant amount of mission planning and event timing, all of which can be ruined by a single unit having to cancel at the last minute or being unable to connect due to network or simulator issues. Likewise, in a larger event, the likelihood that one unit may be forgotten about increases, as does the chances that this unit’s training objectives will not be fully accomplished. This left the DTOC with what it viewed as the only viable option when connecting multiple disparate units: expand the number of white force

personnel to ensure that every participant was accounted for. Using this approach allowed the warfighters to train together when it made sense and when training objectives coincided, but to then go their separate ways and work with the white force in between those distinct events.

This approach mirrors what happens in real combat. One imagines a series of Venn diagrams, each circle, or simulator, overlapping in part with each other. Rarely will one warfighter interact with the same agency the entire time he or she is 'on-station.' For example, a CAS fighter may only work with an Air Support Operations Center (ASOC) in short bursts. In between that interaction the aircraft may be working with a JTAC, ground personnel, or with other aircraft to prosecute a target. Meanwhile, the ASOC will be working a variety of other taskings. The challenge is developing injects that allow the warfighters to work together when it is appropriate, but then still have the white force cadre available when the virtual participants go their separate ways within the scenario.

The other significant challenge when combining disparate platforms was the inevitable technical hurdles. The DMON Standards have been extremely useful in overcoming many issues, but there are still obstacles yet to be addressed or fully implemented. The key to overcoming those differences is recognizing prior to the event where the commonalities lie, and ensuring that the portion of the event involving virtual to virtual play is seamless. The white force can then work around other simulator idiosyncrasies through intelligent role-playing. Once again, the need for a highly trained and experienced white force cadre is demonstrated.

Over time, the DTOC stopped trying to force the pick-up game construct. This does not mean that the days of large-scale DMO are over, not should they be. For some training objectives, especially larger mission rehearsal exercises, there will continue to be a need for large force-wide DMO events. Likewise, as long as there is a competent white force engaged throughout the event, medium-sized events consisting of 3-4 virtual players still makes sense. However, as previously discussed, these events require a significant amount of white force support, mission planning, and technical de-confliction and standardization. These events will likely be the exception rather than the norm.

DMO Usage Continues to Grow

The explosion of DMO growth at the unit level is due in large part to the availability of tactical, small-scale

DMO training events. A fair portion of the DMO events within ACC involve only a single unit working with white force manned constructives. This allows the unit to focus on the fundamentals; the ball handling, passing, defense, and shooting. Because they are the sole participant, they drive the entire training event. The white force requirement for these types of events is relatively small, three or four individuals manning the constructive training environment. This type of training mirrors what the warfighters encounter on a daily basis. Rarely do units get to participate in large-scale exercises such as Red Flag or mission rehearsal exercises. Rather, the vast majority of their training consists of unit-level training. Not only is this unit-level training mandated by ACC, but it is necessary in order to maintain one's skill sets. The value of DMO is that they get to "play" with other agencies and platforms in a more realistic scenario, but still focus on their own internal training requirements.

Undeniably, one of the driving forces behind the increased DMO usage was ACC's decision to permit an expanded number of training requirements to be satisfied within the simulator. Additionally this growth was accelerated by evolving simulator technology and the innovative use of white force support. Once the warfighters indicated that the training they were receiving in the simulator often exceeded what they had been getting in live-fly, ACC leadership quickly responded and allowed an even greater number of DMO training "counters." DMO sorties can now satisfy training requirements in almost every weapon system. For some platforms, a DMO event can replace an actual live-fly mission.

The challenge now is to continue to push the envelope. ACC recognizes that additional standards work is required, especially in the CAS arena. Some, but not all, of those challenges will be addressed with the implementation of Mission Package-09 (Mission Package-09 is a CAS-centric compilation of standards that ACC and DMON are developing to facilitate DMO standardization based on mission type). Likewise, ACC will continue to evaluate the training requirements of the individual weapon systems and determine what other areas are compatible with DMO. Part of the responsibility lies with the units themselves, especially the experienced warfighters in the weapons, training, and leadership positions. They must continue to demand more from DMO, but also be willing to accept DMO even though it may not yet be a perfect solution. They must continue to work with ACC and the DMO service providers to determine how the existing capabilities of DMO can perhaps satisfy their training needs. Unless they ask the question, they will never know the answer.

SUMMARY

ACC's vision of CAF DMO was to provide a capability wherein units could connect multiple platforms together and conduct daily sensor-shoot training. The reality, however, is that operators are busy with normal daily operations and do not have access to an infrastructure to easily enable this training.

One solution which has been very effective and was not envisioned by the ACC leadership was to allow a single unit to work solely with a manned white force constructive element to meet specific training needs. ACC is now looking to build upon the successes and lessons learned from working with the DTOC. ACC anticipates expanding the implementation of the manned constructive and dedicated white force in order to support future 5th Generation training requirements of multi-platform events.

The current state of DMO within the CAF is a good-news story that was the result of over a decade of hard work, periodic failure, and persistence. Although it appears the corner has been turned in terms of the acceptance of DMO within the CAF, its future success is not yet guaranteed. We must all continue to improve technology, expand standardization, and find more efficient ways to do more with less.

FUTURE WORK

Although ACC is encouraged by the feedback and usage it has seen over the last year, it recognizes that additional work is still needed. As such, ACC continues to elicit suggestions from the community as to what technological improvements need to be developed, as well as what changes to the standards are required. ACC recognizes that combat and combat training will inevitably become even more reliant on datalinks, unmanned sensors, electronic warfare, and the capabilities associated with the next generation of aircraft. ACC, in conjunction with the simulator manufacturers, the network providers, the threat generators, the warfighters, and the white force

providers will all have to work together to determine how best to incorporate and replicate these new capabilities. Correspondingly, the next decade will likely bring with it a renewed food-fight over scarce defense dollars. Although DMO has proven itself as a cost-effective return on investment, ACC recognizes that it will need to continue to invest wisely in DMO to ensure that it remains a viable training alternative. In addition, as the need for manned constructive white force grows, there will be a corresponding requirement to ensure that the white force is properly trained. DMO providers will likely need to follow a similar path that the DTOC has gone down and create a specifically tailored internal training plan that in some respects is modeled after a typical squadron's stan-eval and training shops. The current state of DMO may be a good-news story for the Air Force as well as the modeling and simulation community, but ACC is well aware that more work is needed. Only then can DMO truly fulfill its potential as an invaluable force multiplier and integral component of the warfighters' training.

REFERENCES

- Aldinger, M., & Keen, S (2007), *CAF DMO Standards-Based Approach for Achieving M&S Interoperability*. Paper presented at NATO RTO Symposium on "Improving M&S Interoperability, Reuse and Efficiency in Support of Current and Future Forces," September 2007.
- Capstone Requirements Document (2007), CAF (USAF) 009-93 for Distributed Mission Training, Langley Air Force Base, VA, Headquarters Air Combat Command
- Northrop Grumman Distributed Mission Operations, Operations and Integration Website. Retrieved May 1, 2010, from <https://secure.dmodmt.com/standards/index.cfm>