UNITED STATES AIR FORCE BATTLESTAFF TRAINING SCHOOL AND BLUE FLAG EXERCISES: CAPABILITIES AND CHALLENGES

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ABSTRACT

The USAF Battlestaff Training School (BTS) provides command and control training opportunities for the Joint Force Air Component Commanders (JFACC) and their staffs who man the Joint Air Operations Centers. The JFACC is responsible for all allied air operations in a theater of war, and produces the Air Tasking Order for each day of the war. The BTS conducts this joint-service training via three BLUE FLAG exercises yearly for thousands of warfighters. The training emphasizes the use of real-world plans, procedures and C4I equipment. The BTS employs extensive computer simulation and uses distributed technology to train warfighters at local and deployed sites.

This paper describes the BTS's training philosophy, strategies, and assets. In addition, it explores certain training challenges and opportunities which BTS is currently addressing. Applied R&D is being used to examine a number of techniques and technologies which may enhance the BTS's capability.

For example, the BLUE FLAG exercised have traditionally been based solely on constructive wargame models. This approach has worked well given the main objective of the BTS is improvement of command and control decision making. However, wide area networking and the use of Distributed Interactive Simulation (DIS) has now made it possible to link BLUE FLAG exercises with live and virtual assets. The use of Advanced Distributed Simulation (ADS) techniques has enhanced the ability to stimulate the Command and Control equipment with real-world datalinks and operational feeds. BTS has participated in demonstrations of this capability, but there are still many questions that remain about the utility of making these links. Will overall command and control training effectiveness be improved as a result of these interactions? What part of JFACC training might benefit most from distributed networking? These and a number of other networking questions are being explored and are discussed.

Another topic of interest is developing better techniques for providing accurate and timely feedback to the JFACC staffs about their performance during BLUE FLAG exercises. Possible future approaches to automating the analysis and feedback function for use by the hundreds of warfighters involved in BLUE FLAG exercises are described.

Biographical Sketches

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Joint Force Air Component Commander's (JFACC) Mission

The United States Air Force Battlestaff Training School (USAFBTS) provides command and control (C2) training for the Joint Force Air Component Commanders (JFACC) and their staffs who man the Joint Air Operations Centers (JAOC). A JFACC is a senior officer from one service branch, such as Air Force or Navy, who is responsible for all air power employment in a specific theater of operations. The JFACC is appointed by the theater Commander in Chief (CINC) or Joint Task Force (JTF) Commander. The JAOC is composed of the JFACC, his joint staff (including Air Force, Army, Navy, Marines, and special forces), and coalition representatives from the specific theaters of operation. The JFACC is responsible for all allied air operations in a theater of war, and produces the Air Tasking Order (ATO) for each day of the war.

Some of the constraints in training the JFACC and his staff include:
1) Overwhelming real-world commitments.
2) Non-standard C4I equipment between theaters of operations and service components.
3) Frequent personnel turnover.
4) Peace-time manning levels require augmentation for training and deployments.

In order to minimize the impact of these constraints, the Numbered Air Forces (NAF) participate in highly intense, robust training exercises. RED FLAG exercises provide tactical level training via live flight missions over the Nellis AFB, NV ranges; GREEN FLAG exercises build on a RED FLAG by incorporating the electronic warfare aspect of combat; BLUE FLAG exercises train command, control, computer, and intelligence procedures at the operational/theater level of warfare.

Battlestaff Training School's Mission

The USAF Battlestaff Training School, located at Hurlburt Field, FL, is part of the 505th Command and Control Evaluation Group, a subordinate unit of the 53d Wing, Eglin Air Force Base, FL and the Air Warfare Center, Nellis AFB, NV. The Air Warfare Center is a component of Air Combat Command, located at Langley AFB, VA. Air Combat Command is responsible for organizing, training and equipping the combat air forces within the United States. The Battlestaff Training School is tasked by Air Combat Command to conduct a series of BLUE FLAG exercises each year to train combat leaders and supporting battle staff personnel in command, control, computer, and intelligence procedures for specific theaters of operation.

The USAFBTS mission is to train the JFACC team through realistic, computer-assisted exercises focused on air power employment. The school's vision is to feature world class command and control experts, training battlestaffs to achieve information dominance while optimizing air and space power employment. USAFBTS hosts BLUE FLAG exercises to train America's Numbered Air Force staffs as the core for the JFACC staff. Although the primary training audience is the NAF staff, other services and coalition forces receive valuable training during BLUE FLAG exercises. Representatives from the Army, Navy, Marines, Special Forces, and coalition forces all participate as valuable components of the Air Operations Center (AOC). The Battlestaff Training School has the capability to develop a scenario for any situation or location for its BLUE FLAG exercises.

Key to BLUE FLAG exercise success is the BTS training philosophy. The goal is to make the wargame as realistic as possible, such that

participants cannot distinguish it from combat. The school accomplishes this by replicating the actual C2 structure, using real-world equipment, and using knowledgeable exercise controllers to replicate the enemy and all other agencies not physically represented in the game. A key component of the BLUE FLAG training is to facilitate interaction among the participants.

BLUE FLAG Exercises

BLUE FLAG exercises are Air Combat Command's foremost large scale, force-on-force, computer-assisted, airpower exercises. They provide joint service C2 battlestaff training by emphasizing real-world plans, procedures, and command, control, communications, computers, and intelligence (C4I) equipment. The NAF commander and his staff develop training objectives which drive each exercise. Several planning conferences are held during a 6 month planning cycle. This allows the USAFBTS staff and the NAF staff to work closely in designing the exercise to meet the training objectives. It is the sole responsibility of the JFACC and his staff to determine if training objectives have been met. USAFBTS provides a copy of the lessons learned and a final report to the NAF. These reports are a compilation of inputs from senior players, controllers, and USAFBTS staff. More will be said about potential ways to improve the feedback process below.

Each BLUE FLAG exercise begins with two to three days of computer, academic and seminar training, focusing on the skills needed to man a fully functioning Air Operations Center. This is followed by a four to five day, computer-assisted exercise using actual friendly and enemy orders of battle, contingency and war plans, and theater procedures in a simulated military operation. Participants are given maximum flexibility in managing the employment of friendly forces thus allowing player actions to influence the battle outcome.

BLUE FLAG exercises attempt to duplicate theater conditions and procedures with maximum fidelity. USAFBTS planners research friendly and enemy force structures, communication capabilities, logistics support, command and control procedures, and current plans and directives. USAFBTS relies partially on theater advisors for validation of exercise scenarios and proper location of participating headquarters and wartime command and control structures. Theater advisors may also assist with some player training and act in non-player, higher headquarters control functions.

USAFBTS utilizes four primary computer models during BLUE FLAG exercises to interface with operational C4I systems. Each of these models replicates reality in a distinctive way and uses automated interfaces and information management.

The first of these models is the Air Warfare Simulation (AWSIM). AWSIM allows the school staff to model a wide range of airborne platforms and ground based defensive systems. AWSIM also flies airborne platforms and fires surface-to-air missiles in real time.

The second model, the Theater Exercise Intelligence Simulator (TEXIS), replicates only ground based objects such as radars, buildings, airfields, surface-to-air missile (SAM) sites and mobile targets. Objects are loaded into the TEXIS database so that actual mission results and reports can be generated from an AWSIM flown attack. TEXIS replicates 15 reconnaissance collection platforms to observe these objects.

A third model, the National Wargaming System (NWARS), simulates national reconnaissance assets. It interfaces with TEXIS to generate reports and information for player analysis. More importantly, it teaches players the national reconnaissance request process.

Our fourth model is the Joint Electronic Combat/Electronic Warfare Simulation (JECEWSI), an electronic combat model. Through JECEWSI's interface with AWSIM, the BTS staff accurately models the force multiplying nature of electronic combat aircraft like the EF-111 and EC-130.

Overall, these systems help BLUE FLAG controllers fly the player developed Air Tasking Order (ATO) against a thinking enemy. By wisely using these tools, the BTS staff maintains a high degree of realism throughout the wargaming phase of training.
More than 40,000 personnel from all branches of the military have participated in BLUE FLAG training. The first BLUE FLAG exercise was conducted in December 1976 at Shaw Air Force

Base, SC. The original exercises involved live flying operations. However, in 1979, the simulation exercise format was adopted to emphasize the primary training objective of battle commanders exercising an integrated war campaign.

In 1984, BLUE FLAG began its evolution from the grease pencil into the computer age. The first step was to employ the Tactical Simulation (TACSIM) to portray ground and intelligence orders of battle. In 1985, the Air Defense Simulation (ADSIM) was incorporated to replicate friendly air defense forces against enemy air forces. Through the next five years continuous improvements were made in both simulations to meet growing needs for a truer depiction of battle.

The year 1990 produced quantum advances in capabilities to portray a theater war. TACSIM was improved and modified to such an extent it no longer resembled the original program and was renamed the Theater Exercise Intelligence Simulation (TEXIS) to represent ground orders of battle and to produce mission results and reconnaissance reports. ADSIM no longer met the need for the air war and was replaced with the Air Warfare Simulation (AWSIM) to better portray the air war. This new software allows both offensive and defensive activities to be executed simultaneously.

Also in 1990, the USAFBTS accomplished a first for a unit located in the United States by conducting a distributed wargame, Warrior Flag 90. This exercise, using distributed wargaming system (DWS) equipment, demonstrated the technology to distribute training and secure video teleconferencing simultaneously to multiple remote locations on separate continents. In January 1992, BLUE FLAG acquired a five-site remote capability to augment its DWS exercise function.

The Contingency Theater Automated Planning System (CTAPS) was fully integrated into BLUE FLAG exercises in 1993, further enhancing the USAFBTS reputation for accurately replicating real world command and control systems in Air Operations Center and Joint Force Air Component Commander training. USAFBTS has hosted CTAPS testing of improved versions being readied for operational fielding.

In January 1995, Gen Fogleman, USAF Chief of Staff, sent a new vector challenge for Air Force simulation to all Major Commands - specifically to accelerate insertion of advanced simulation technology into our training and testing. WARFIGHTER 95 was the first major step in that direction. The purpose was to validate advanced distributed simulation (ADS) technology for application into future BLUE FLAG exercises and JFACC team training. This exercise provided several new technologies that have been incorporated into our current day BLUE FLAG exercise suite. Using Distributed Interactive Simulation (DIS) to stimulate a variety of models and simulations, the real-world air picture is now provided via Tactical Digital Information Link (TADIL) and Tactical Information Broadcast Service (TIBS) into the AOC. The Joint Synthetic Battlespace is the goal of the future and will eventually tie together many types of simulation where warfighters and analysts will be able to plug into a common battlespace from desks, simulators, aircraft and crew stations, linking services and civilian counterparts to train and conduct warfighting.

USAFBTS has received direction from higher headquarters to improve training in the following areas:
1) Increase realism in painting the battle situation keep “fog of war” add “blizzard of information ”transition from sensor scripting to displaying
2) Include subordinate C2 elements AWACS and ABCCC aircrews Air Command Element (ACE) teams Control and Reporting Centers/Elements (CRC/CRE)
3) Include selected events from the tactical level
4) Merge constructive, virtual, and live operations

Within the past year the Battlestaff Training School has been able to triple the number of intelligence messages sent during an exercise, but this number still falls short of the message traffic in actual combat. Even this level of 3000 messages per day overwhelms operators trying to find key information amid the myriad data.

Making the transition from scripting sensor reports to displaying sensors in action is a significant challenge. The key is having a theater-level ground database that can be seen by sensor models, and meet the requirements for doctrinally sound engagements, damage reporting and execution speed. The school is

not there yet. Promising solutions are being worked, including the JC2WC developed Joint Operations Information Simulation (JOISIM) and the longer range Joint Simulation System (JSIMS).

This past year BTS expanded the participation to C2 units immediately subordinate to the air operations center (i.e., AWACS, CRE, CRC). Modular Control Element (MCE) units were manned by the 505 Test Support Squadron to act as CRE and CRC platforms. The AWACS simulator, located at Tinker AFB, OK, participated as a distributed site providing datalink messages to the combined air picture.

WARRIOR FLAG 97 was the next step in creating the Chief of Staff's vision of a Joint Synthetic Battlespace. Live, Virtual, and Constructive simulation were combined to create an enhanced BLUE FLAG type exercise. WARRIOR FLAG was our chance to test out new technologies without interfering with a BLUE FLAG training exercise. Technology improvements which prove to be valuable training aids were injected into future BLUE FLAG exercise. Figure 1 shows the major assets involved in producing Warrior Flag '97.

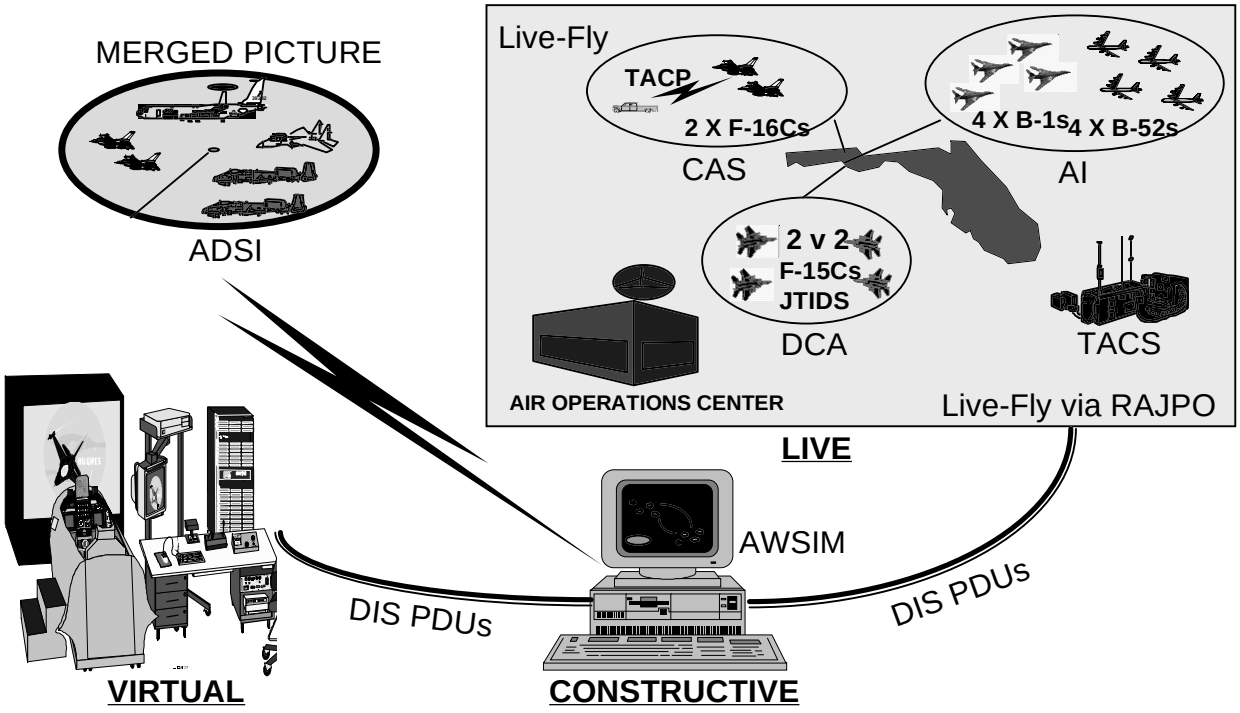

Figure 1. Assets involved in Warrior Flag '97 exercise

The diagram above depicts the general combat elements that made up WARRIOR FLAG 97. Live aircraft equipped with Global Positioning System (GPS) relay pods flew over the Eglin AFB, FL, ranges and sent their positional data to computers which converted their position to DIS protocol data units (PDUs). These were then displayed in a common air picture with the constructive and virtual models. We used the same architecture as we use in a BLUE FLAG exercise. This architecture was enhanced by the live injects and by DIS compliant virtual simulators. A portion of the ATO was flown out by virtual cockpits located in at the Air Force Research Laboratory's Aircrew Training Research Division in Mesa, AZ, and by virtual simulators in Albuquerque, NM and Washington DC. All of these inputs were displayed in a common fused air picture and monitored by the JFACC and his AOC staff located at Hurlburt Field, FL..

Feasibility and Value of Linking BLUE FLAG Exercises with Live and Virtual Assets

Technology Issues

As we move toward implementing the Joint Synthetic Battlespace envisioned by the Air Force Chief of Staff, there will be increasing horizontal and vertical integration of the different classes of models and simulations. This will provide revolutionary synthetic environments, containing various mixes of computer models, weapon system simulators, and actual warfighting systems. The entities within these environments will be geographically dispersed and will communicate through high-speed communications networks. The result will be a hierarchy of models and simulations to support such functional areas as training, test and evaluation, analysis, and decision support.

Technical progress is readily apparent. There have been numerous instances in which the various combinations of live, virtual, and constructive simulations have been linked together to support technical demonstrations, concept development, operational tests, and training. There are, however, still a number of challenges associated with creating the Joint Synthetic Battlespace. These challenges involve the development, integration, and fidelity of appropriate models and simulations, communication between geographically separate sites, execution of geographically distributed training involving different training audiences.

These technical challenges include:

Communication protocols. Although there are a number of unique protocols used to link various models and simulations operating on local area networks, the Aggregate Level Simulation Protocol and Distributed Interactive Simulation protocols have been the primary means of wide area network communication in recent years. Unfortunately, both of these protocols represent "work in progress" that have not been fully developed. The near term impact of the transition to High Level Architecture on the integration of live, virtual, and constructive simulations as well as its impact on the continuing development of communication protocols remains to be seen.

Fidelity. Constructive simulations generally present the individual weapon system and the warfighter's behavior at a lower level of fidelity than either live or virtual simulations. Consequently, entities represented by live and virtual simulations typically display behaviors that are more variable, complex, and realistic than those exhibited by constructive entities. For example, live or virtual entities are typically more likely to have their performance disrupted by fatigue, stress, or workload than constructive entities.

Bandwidth. The use of live and virtual simulators usually means there is a requirement for close coupling between at least some of the entities. Generally speaking, these closely coupled systems are high fidelity, human-in-the-loop entities which demand a higher degree of interactivity than typical constructive entities. To support this higher degree of interactivity, data is typically exchanged more often. Thus, for a given network bandwidth, a few-on-few engagement involving live or virtual platforms could produce the same network loading as a many-on-many battle comprised solely of constructive entities.

Command and control. There are a number of command and control challenges involved in "seamlessly" integrating live, virtual, and constructive entities. For example, there are real world constraints on the actual weapon system that must be managed as part of the simulation. Live weapon systems must adhere to the range safety rules, air traffic control, and airspace restrictions. As a result, the rules of engagement between live entities may be significantly different from those for either virtual or constructive. Another challenge involves the fact some interactions are logically impossible between the various classes of entities. For example, although a live entity can engage either a virtual or constructive entity beyond visual range, there is no realistic way to allow virtual or constructive entities to become part of a close-in, visual engagement.

Aggregation. Different models and simulations operate at different levels of granularity. Live and virtual simulations represent individual warfighters and their weapon systems. To adequately support these individual warfighters, detailed platform dynamics, terrain resolution, time steps, and weapons effects are essential. On the other hand, constructive simulations often represent aggregated units without

detailed modeling of individual platforms or terrain. Algorithms representing typical behaviors, weapons effectiveness and attrition are used to produce aggregated combat results. Because the level of granularity differs between constructive and live/virtual simulations, it is necessary to aggregate the live/virtual forces into appropriately sized units and to incorporate the results of live/virtual simulations into the various engagement and attrition models used by the higher level model.

Sensor data. The representation and transmission of sensor data such as radar cross section, radar modes, and infrared signatures is one of the major issues in Advanced Distributed Simulation. The accurate communication of such data within virtual simulations as well as between the various classes of simulations is essential for depicting the Joint Synthetic Battlespace accurately.

Training Value. The goal of training is to improve the performance of personnel. The Joint Synthetic Battlespace provides an enriched environment for mission oriented training. The generic structure of this environment is shown in Figure 2. This environment assumes mission plans, doctrine, and tactics are combined with an appropriate training philosophy to create new or improved training opportunities. The integration of live, virtual, and constructive simulations provides an opportunity for warfighters to improve their skills at the engagement level while commanders and staffs are improving their decision making and management skills. These performance improvements may be reflected in improved use of weapon systems, better team work and coordination, or improved decision making.

Although the idea of integrated training within the Joint Synthetic Battlespace has a great deal of intuitive appeal, detailed training needs and media analyses, training syllabi, and training effectiveness measures have not been developed. Instead, the general approach seems to be predicated on the notion that if we can successfully create the mission environment, we will be able to improve training. While this may be true, there are a number of inherent training risks involved. All other things being equal, we know the more time individuals spend practicing a task and the better the feedback those individuals receive about their performance, the better their performance. One of the potential problems in combining a number of different echelons within the same simulation exercise is the different echelons operate along different time scales and have different objectives. As a result of these differences, individual warfighters may be forced to “hurry up and wait” until their opportunity to perform at the engagement level occurs. The net result of this is their time on mission critical tasks is not optimized. Another problem is the level of detail concerning individual performance differs across echelons. Individual warfighters in live or virtual simulators typically require detailed feedback and review of individual decisions and actions at a number of different points within their mission. The JFACC and his staff, on the other hand, are rarely concerned about individual performance. Instead, they must assess the impact of aggregate performance on mission accomplishment and future mission plans. Figure 2 depicts the integration of live, virtual and constructive assets for command and control training.

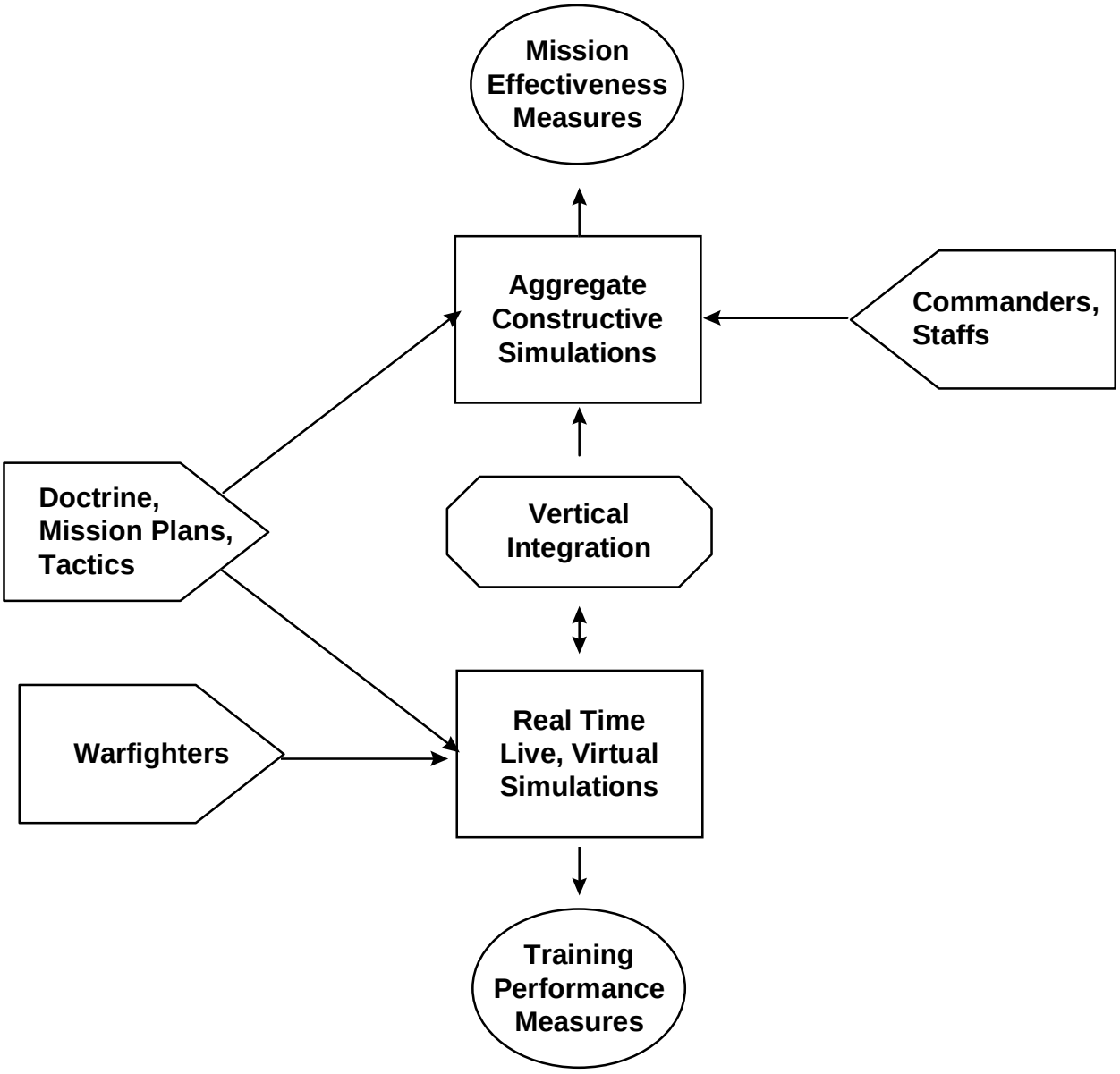

Figure 2 - Integration of Live, Virtual and Constructive Assets for Command and Control Training

Potential Techniques for Improving BLUE FLAG Exercise Feedback to the Joint Force Air Component Commander and Staff

Current Feedback Challenges

Quality and Value - As described above, the ratio of BTS controllers/observers compared to BTS participants is quite low. It is not possible for the BTS analysts to observe and catalog each error committed by individuals, teams, and the entire JFACC staff due to the number and rapidity of activities occurring minute by minute. In addition, these activities often occur in a manner that is not observable by the BTS staff. For example, JFACC team members interact with each other using handwritten and electronic notes and orders, telephonic communications, and face-to-face discussions. It is simply not possible for the BTS staff to monitor all interactions between JFACC members.

The prime responsibility for gathering JFACC process and performance data lies with the Analysis Division in the BTS. They work with the JFACC staff before each exercise to ensure their training requirements are clearly identified so the BLUE FLAG training scenarios can be structured to allow the JFACC staff to be stressed in key areas. This pre-exercise analysis gives the BTS staff key indicators to look for as they observe BLUE FLAG exercises. Thus, the feedback they develop from their observations tends to be directly relevant to exercise objectives. In addition, the BTS staff attempts to observe NAF behavior that is not anticipated in case behavioral feedback can be developed based on those activities. However, developing feedback based on either anticipated or unanticipated activities is a challenge due to the very large number of activities occurring and the relatively few observers available.

The value of the feedback varies depending upon the willingness of the JFACC staffs to use it, and their ability to make use of the BTS staff's observations. Some JFACC staffs make only limited use of the feedback because they feel it is not directly relevant to what they perceive their weaknesses to be. In some cases, the JFACC staffs may see the relevance of the feedback, but may not be able to make immediate or full use of it because of the time constraints inherent in an on-going exercise. In these cases, the post-exercise feedback is very valuable because the JFACC staffs then can reflect on the feedback and build remediation strategies at a more leisurely pace.

Timeliness - A long established principle of effective learning requires feedback to be delivered to the learner as soon as possible in most cases. The nature of BLUE FLAG exercises makes it very difficult to provide the necessary feedback to many of the NAF staff members in a timely fashion. Normally, there is a formal feedback session provided to key NAF staff members by the BTS analysis division at the end of each day and to Combat Plans on a daily basis. In addition, BTS staff members will also give feedback to BLUE FLAG participants at certain times during the exercise if they see something that is a serious problem. Generally, however, the BTS staff will wait to provide feedback until a logical stopping point in the exercise.

The BTS staff must make a series of trade-off decisions about when to provide feedback. While it is advantageous to provide feedback as soon as an error occurs, it would be disruptive to the flow of the exercise to continually interrupt it. After all, the NAF staffs come to BLUE FLAG to get a realistic command and control experience. Providing feedback in a disruptive fashion would perhaps bring too much artificiality to the training setting. This dilemma is not unique to the BLUE FLAG exercises, but it is exacerbated by the number of participants.

Manual Nature of Current Feedback Approaches - Currently there are no automated tools to help BTS analysts in developing their feedback comments. The analysts use paper checklists and notes to keep track of their observations and to formulate feedback comments. These observations and comments are kept in a paper archive for future reference as the BTS observers prepare final reports for each BLUE FLAG exercise. PowerPoint presentations are used to give feedback at the end of each exercise day.

Large Volume of Data Generated by a BLUE FLAG Exercise - As indicated above, one of the difficulties in generating quality feedback is the sheer volume of data produced by a BLUE FLAG exercise. One can imagine the number of digital, voice and written communications passed between the 1200 plus personnel at each exercise over the course of a week. Determining which pieces of data are important enough to examine, collect and catalog is crucial to developing useful feedback. The BTS staff has extensive experience at knowing what to look for, but again, the large amount of data means there is always a chance that some important data may not observed.

Potential Feedback Techniques and Technologies

Data Capture Tools that Combine Disparate Streams of Data - Before quality feedback can be developed in any learning situation it is first necessary to define which data are indicative of quality or poor performance. The BTS staff has made some progress in defining which criteria are critical as indicators of a quality Air Operations Center; however, due to the complexity of AOC activities it is very difficult to define a complete set of criteria that

are always relevant to each BLUE FLAG exercise. Recently, the Air Force decided to treat an Air Operations Center like a weapons system which will lead to more clearly defined performance criteria.

As described above, there is a large variety of data which is produced by the many teams and sub-teams which participate in a BLUE FLAG exercise. The quantity and quality of feedback that can be derived from an exercise is directly affected by the data the BTS analysts can capture. Current techniques for capturing all of the relevant data are limited to what the BTS analysts can see and hear. What is needed is an automated tool or tools which will allow the analysts to combine what they see and hear with digital data taken from the exercise when possible. A few examples of the type of data which might be captured and then used in the derivation of feedback might help to illustrate this point:

- Data plots of the number of intelligence inputs to the Air Tasking Order planning process.
- Data plots of inquiries, along with their type, from one sub-team to another
- Types of sorties generated, along with their success rates

There are many other examples of data that when analyzed together could help us understand the fog of war. While all of these types of data can probably be collected right now by the BTS staff, there is no way to synthesize the data so the entire AOC "picture" can be seen. By seeing the picture, we are not talking about looking at a battle map of the theater, but rather examining the processes together which indicate how the ATO is developed and how that process can be improved. The BTS staff needs a capability to quickly detect and analyze data trends, patterns, and anomalies.

A key advantage of these types of data tools would be the rapidity with which the feedback could be applied to the JFACC trainees. It may not always be appropriate or effective to provide immediate or nearly immediate feedback to the NAF personnel because BLUE FLAG exercises are designed to be realistic, and providing feedback in the middle of the exercise would often harm that realistic nature. However, there are times currently when Battlestaff Training School staff will provide feedback on a more frequent basis than merely at the end of the exercise day if they see the JFACC battlestaff make errors so severe the end objectives of the exercise cannot be achieved. With the data capture, analysis and feedback tools described in the section such immediate feedback would be more precise and timely than current BTS staff observations allow.

These types of tools would also greatly aid the quality and quantity of the feedback provided to the NAF battlestaff at the end of an exercise day. Whereas, the feedback now tends to be in the nature of verbal briefings, aided by manually constructed PowerPoint slides , improved feedback could be given via computer graphics presentations generated from data automatically collected as the exercise proceeds. Using pre-planned templates, the BTS analysis division could build the necessary briefing graphics quickly.

The most important benefit would be the capability to allow both analysts and the JFACC to "experience" the data from a variety of viewpoints and perspectives. Rather than merely show "bird's-eye" views of the theater, with battle units identified via icons, these new tools would, at the touch of a button, show trends, patterns and anomalies that would not likely be seen by the BTS analysts by merely observing exercises.

Finally, these data capture and feedback tools could be used to create BLUE FLAG archives which could be used for analysis purposes to detect good and poor Air Operations Center practices across Numbered Air Forces. Currently, BLUE FLAG exercise scenarios are different enough between NAFs, and the data generated by each exercise is so vast, that it is not possible to synthesize exercises processes and products on a large scale. Therefore, analysts cannot adequately compare and contrast AOC approaches between the NAF battlestaffs that participate in BLUE FLAGs .

Conclusion

The Air Force's Battlestaff Training School has evolved a highly sophisticated and successful approach to training large battlestaffs. An indication of the BTS's effectiveness is shown by the fact Joint Force Air Component Commanders continue to request opportunities to work with the BTS in BLUE FLAG exercises. As has been proven many times in past wars, a military force is no better than its command and control capabilities, despite its size or technological prowess.

Despite its current effectiveness, the BTS Commandant and staff are always exploring new methods and technologies to keep the BLUE FLAG exercises on a path of continuous improvement. Examinations of how best and when to link live and virtual assets into wargaming exercises will help to strengthen the degree of realism BLUE FLAG trainees experience. In addition, better ways to capture and provide quality feedback to battlestaffs will prepare them more completely for challenges they are likely to face in war.