AIR LAND SEA BULLETIN




Issue No. 2015-1 | Air Land Sea Application (ALSA) Center | *November 2014*

Joint Training in a Constrained Environment

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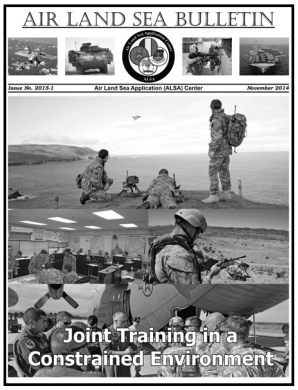


Top: Unidentified Royal Air Force Regiment forward air controllers from the Air Land Integration Cell, Based at Royal Air Force Honington, Suffolk (United Kingdom), guide a Typhoon aircraft from 6 Squadron onto their target at the Cape Wrath practice range in Scotland March 29, 2013. (Photo by Sgt Andy Walker, Royal Air Force)

Middle Left: Unidentified Command and General Staff Officer Course students engage in a small staff group tabletop exercise August 12, 2014. Such small group training exercises are relatively easy to execute and do not involve elaborate facilities. (Courtesy photo)

Middle Right: United States (US) Navy LT Richard Madrid, left, uses a StrikeLink tablet to send coalition aircraft ground target identification data during the live fly portion of Bold Quest 14.2 May 15, 2014. Bold Quest 14.2 was held on Holloman Air Force Base, New Mexico, May 3-22, 2014. Madrid is with the 2nd Air Naval Gun Fire Liaison Company stationed at Camp Lejeune, North Carolina. The person on the right is unidentified. (Photo by Staff Sgt Joe Laws, USAF)

Bottom: Capt Tom Dorsett, a navigator with the 192nd Airlift Squadron, 152nd Airlift Wing, Nevada Air National Guard, briefs paratroopers prior to a jump as part of the Allied Forge exercise May 29, 2014. This exercise, led by the US Army's 82nd Airborne Division and the 152nd and 165th Air National Guard Airlift Wings, is the first interoperability exercise designed to enhance bilateral capabilities between the US and the French 2nd Foreign Parachute Regiment, French Foreign Legion. (Photo by Capt Jason Yuhasz, USAF)

DIRECTOR'S COMMENTS

Over the last two years it has been my distinct privilege to serve at ALSA. As I prepare to retire and hand the reins to the capable leadership of COL John Smith, I look back over my 24 year career on what is the most important nugget of wisdom I can pass on to the next generation of Warfighters? The answer is "training". Next to defending our Nation it's the most important thing we do. You never know when your last training sortie or mission will be before the call to arms comes again but, the call will come and will you be ready?

This issue of the Air Land Sea Bulletin (ALSB) is focused on this essential task in preparing to defend our nations. It is titled, Joint Training in a Constrained Environment. Current challenges in personnel and budgets reductions, and force restructuring while returning to in-garrison training schedules will further strain our ability to maintain readiness in a very uncertain world. Our Services have been here before; and to meet this difficult challenge, it is essential we innovate while forced efficiencies affect the way we train. Joint Training… highlights opportunities and solutions, and examines ways to maximize our precious training.

The first article, "The Weighted Sword," by retired Col John R. Culclasure (USAF), reflects on the past, present, and future of joint training in a constrained environment. The article is rooted in the Roman legion's training technique, "double weighted sword", and its benefits.

The second article, "UK Joint Training in a Resource Constrained Environment," by Cdr Ken Barlow (Royal Navy), demonstrates how one of our closest allies is grappling with similar issues. This article aims to describe the ways in which the United Kingdom is addressing the near-term resource constraints by maximizing the efficiency of joint training.

The third article, "Improving Joint Fires Performance with Distributed Live/Virtual Environments," by Emilie A. Reitz and Kevin Seavey (Joint Staff, J-6), utilizes the backdrop of Bold Quest 14.2 to present the benefits and possibilities of live, virtual, and constructive training.

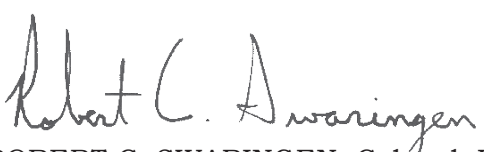
The fourth article, "Advancing Distributed and Blended Learning," by Nancy Russell (Joint Staff, J-7), discusses the significant advances being made leveraging distributed and blending capabilities. It highlights the application of advanced learning technologies and science of learning methodology for Joint Knowledge Online training courses.

The fifth article, "Warfighter Readiness through Flag-level Exercises," by Maj Rick Martino (USAF), discusses how the three major Flag-level exercises (USAF's Red Flag, Green Flag, and Virtual Flag) offer warfighters the opportunity to hone their skills through multi-Service training integration in joint and coalition environments.

The sixth article, "Understanding C2 in the Joint Environment," by Capt Joseph Feerst (USAF) and Capt Noah Fisher (USAF), discusses functions of command and control and the dilemmas that make it challenging.

The seventh article, "Communicating within the Information Environment," by retired MAJ Kenneth Napier (USA), describes the intricacies of strategic communication, commander's communication synchronization, and communication strategy.

As we continue to tackle the challenges ahead, your participation in joint working groups matters now more than ever. I encourage you to seize opportunities to represent your Service and to share your ideas in future ALSBs. Your perspective can spark innovation. Go to http://www.alsa.mil and be part of the solution. Thanks for reading and I wish you all the best in your endeavors.



ROBERT C. SWARINGEN, Colonel, USAF

Director

THE WEIGHTED SWORD: REFLECTING ON THE PAST, PRESENT AND FUTURE OF JOINT TRAINING IN CONSTRAINED ENVIRONMENTS

By Col John R. Culclasure, USAF (Ret)

INTRODUCTION

Soldiering in the Roman army was arduous. Ancient writings describe Roman legions marching long distances under heavy loads, and building elaborate camps at the march's end.[1] They then conducted a combat drill or sometimes even fought battles.[2] Such a robust army assured the power projection Rome needed to either expand the empire or protect the empire extant. To do the hard work this all entailed, the soldiers performed the concomitant hard training. From the old texts comes a creative Roman training technique, *dupli autem ponderis* translating to "double weighted sword."[3] It entailed mock combat, with dummy weapons twice as heavy as an actual weapon.[4] Ideally, this practice imbued a soldier with more energy and stamina during real combat, given the feel of the genuine but lighter weapon.[5] Somewhat like the Romans, United States (US) forces also train with the weighted sword, metaphorically speaking, due to multiple constraints.

Joint publications explain that "[a] constraint is a requirement placed on the command by a higher command that dictates an action, thus restricting freedom of action."[6] This operational definition also applies in a joint training context. Already somewhat adept at training with the weighted sword by virtue of a constrained environment, US forces will continue to do so as other limitations arise. Indeed, a significant constraining factor is the law; Congress dictates the US military must train jointly. In addition to legal constraints, recent open source rumblings about budget cuts suggest eventual constraints on training.[7] Further afield, world politics might deprive the US of regions where it once maneuvered freely, in turn, limiting traditional training areas. Moreover, certain vulnerable capabilities worry the Joint Chiefs of Staff (JCS), resulting in internally generated training constraints.[8] All of this, actually, colludes favorably since one area always in need of exercise is the mind. Looking back, this all stems from lawmakers' concerns.

Already somewhat adept at training with the weighted sword by virtue of a constrained environment, US forces will continue to do so as other limitations arise.

A WEIGHTED SWORD, BY LAW

By an unofficial consensus, the impetus for change in the joint training arena seemingly points to Operation EAGLE CLAW, the failed Iranian hostage rescue attempt.[9,10] Emphasis on training constraints originated earlier, however. President Dwight D Eisenhower, it seems, inaugurated the idea, given World War II experiences. He realized that "…separate ground, sea, and air warfare is gone forever."[11] Eisenhower endeavored to deprive (constrain) the individual services of any "go it alone" inclinations; and instead, fight "as one single concentrated effort".[12] Decades later, Senator Barry Goldwater added new emphasis making, several impassioned points on the Senate floor,[13] addressing EAGLE CLAW, but also referencing the *SS Mayaguez* incident,[14] and Operation URGENT FURY[15] which he asserted as reasons for Department of Defense reorganization.

Pictured is wreckage left after a helicopter and C-130 collided in the Tehran desert during Operation EAGLE CLAW April 25, 1980. Operation EAGLE CLAW was one event that inspired legislation to force more joint cooperation. (Courtesy photo)

The law perpetuated by the Goldwater-Nichols Act deserves credit as the genuine beginning of the "weighted sword era," if a sobriquet for the post-1986 timeframe is needed.[16] Past military experiences and misfortunes are an interesting beginning, but more current issues now impact training. One constraint, likely generating the most fear, looms large: funds.

FEWER RESOURCES? A WEIGHTIER SWORD!

President Barack Obama issued an apt summation of the economy in 2012, stating the "fiscal choices we face are difficult ones."[17] In an ominous echo, the Chairman of the Joint Chiefs of Staff (CJCS) explained it succinctly: "…complex and uncertain strategic environment combined with fiscal constraints require that we be deliberate, selective, and judicious in determining and resourcing joint training priorities."[18]

Recently, one appropriate decision precipitated, as reported by Howard Altman in the Tampa Tribune. He said, "Special Operations Command is being given a 10 percent boost in its base budget so that it may have 'resources for full-spectrum training, global capabilities, and regional expertise.'"[19] Given the type of combat the joint force has endured of late apparently this is a logical choice.

Following constraints of this ilk, however, tougher funding choices ensue. Indeed, uncertainty must creep in as the combatant commands and the Services contemplate who gets what. Furthermore, consider this paradox: decommissioning Joint Forces Command (JFCOM). This seemed to defy logic during the Goldwater-Nichols era.[20] Yet from a fiscal standpoint JFCOM's demise is a harbinger of things to come.

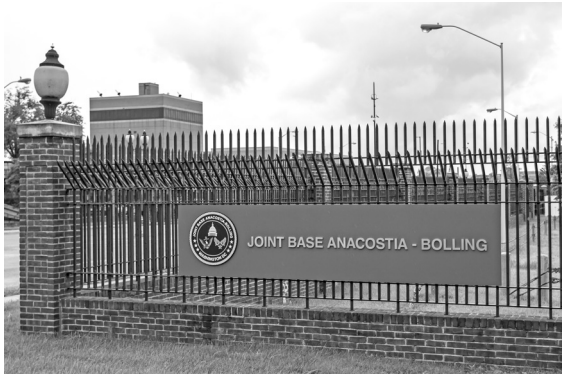
BOXED IN, PAROCHIALISM OUT, JOINTNESS UP

The vicissitudes of recent world politics may constrain US operations in certain global regions. Case in point, the US recently flexed its military muscle by flying B-52s over a contentious portion of the East China Sea.[21] Will the US continue shows of force? Admittedly, the operation was certainly provocative in a calculated way. But, if follow-on political guidance dictates a cessation, familiar regional training areas just got fewer. Closer to home, another trend creates constraints.

Past military experiences and misfortunes are an interesting beginning, but more current issues now impact training. One constraint, likely generating the most fear, looms large: funds.

As dictated by law, new joint basing compels older bases to close their gates, resulting in the realignment of services on existing facilities.[22] To be sure, this deserves a positive review since it reflects "joint flavor" even if only from the standpoint of new installation names.[23] More substantive efforts, however, drive genuine fundamental changes beyond the cosmetic. Specifically, the Services must constantly endeavor to shirk parochialism.

The joint force progresses on this difficult issue,[24] but it must be revisited as younger troops join the ranks. Services must consciously forgo epistles and statements decrying their skill sets as predominant over another Service. Not long ago Gen. Hal Hornburg, a US Air Force combat veteran and former commander of Air Combat Command stated, "If you don't love Soldiers, you have no place in my Air Force."[25] This helps set a proper joint attitude. The US Navy, for its part, prepares to "be ready to part with Navy roles, programs and traditions."[26] But despite vagaries of budget or politics, other internal forces continue to exert constraints.



Pictured is a sign for Joint Base Anacostia-Bolling in Washington, DC taken July 2, 2013. Bolling Air Force Base merged with Naval Support Facility, Anacostia on October 1, 2010 to become Joint Base Anacostia-Bolling. (Photo by LCDR Jim Remmington, USN)

MAKE THAT SWORD HEAVIER

Some constraints highlight special JCS interests. Given its crucial role to the joint force, one specific and extremely vulnerable realm demanding emphasis is space. So much so, JCS dictates this guidance: "Integrate degraded space environments into exercises and training. Training objectives should include conditions whereby the training audience operates in and through the denied/degraded space environment, to include loss of satellite communications and positioning, navigation, and timing capabilities."[27]

Those particular words "denied/degraded" are key and deserve scrutiny. A critic of ap-parent US assumed superiorly in space, Eric Sterner of the George C. Marshall Institute, encourages such constraining efforts.[28] He admonishes that the US must not take space superiority as guaranteed. He also warns that, as adversaries become better at a "capability to deny the United States use of space," it could "mean defeating the United States in an [overall] armed conflict."[29]

Perhaps the constraints discussed thus far create fortuitous circumstances; the joint force is well situated to enhance the war-fighter's best weapon: the cognitive process.

Perhaps a pause is needed here, along with some clarification, to avoid confusion. The JCS guidance may seem odd in that something is being taking away; that, however, is the point. Note that JCS levies a requirement to "do something" but do it "without something". In this case, creating the "denied/degraded space environment"[30] (lost assets) in exercises greatly restricting, in turn, freedom of action. Therefore, the "weighted sword" principle is very much in play.

Loss of resources and restricted physical domains (e.g., space) will likely remain, if not expand, as the JCS preferred training theme. Upon reflection, this is wise since, interestingly, a paucity of resources can stimulate thinking. That proposition thus leads to the most important dimension of the weighted sword: the cognitive.

HEAVY SWORDS MAKE SHARP MINDS

In his memoirs President Eisenhower related that while at Command and General Staff College, he committed a few hours each evening to review at least one specific operation.[31] No better example exists of how individual, personal endeavors lead to success in operational war-fare. Eisenhower's personal story shows a joint force success, in essence, begins as a cognitive process.

Interestingly, Joint Publication 5-0, *Joint Planning*, changed in that regard. While never a recipe for guaranteed operational success, JP 5-0 now includes and endorses "imagination" and "creativity."[32] Perhaps the constraints discussed thus far create fortuitous circumstances; the joint force is well situated to enhance the war-fighter's best weapon: the cognitive process.

To train in the cognitive realm, the basic idea is to introduce scenarios that tax the cognitive process. One concept is the "wicked problems" (i.e., complex problems appearing to defy solution). They seem to resist checklists or structured problem solving processes.[33] Despite their toughness, however, such problems do lend themselves to "tabletop" group work. Actual force movements or other elaborate and costly training measures are not necessary. Plus, any command level can undertake this effort. Eisenhower obviously practiced it at the personal level, too: and, it should be added, to good effect for his later career.

The scenario, of course, is critical. A "school solution" is not the aim; exercising the thought process is. Many may recall Eisenhower's statement: "the plan is worthless; planning [the mental process] is everything."[34] What is, perhaps, more poignant is he later posits that planning is intended to "keep yourselves steeped in the character of the problem," a clear reference to the cognitive process.[35]

CONCLUSION

Fortunately, the joint force has trained with constraints for awhile. Lawmakers have ensured this. Other constraints are inevitable: budgetary, politics, and JCS. Even so, joint training must continue with the resources at hand. As the constraints evolve, it is actually to good effect since the joint force must train to operate in a contestable environment, made so by savvy adversaries. To that end invigorating the cognitive aspects of joint training is critical; training must exact innovative and creative thought to, in effect, "weight the sword." Thus, the genuine engagement may seem easier.

END NOTES

[1] P. Cornelius Tacitus, *Dialogus, Agricola, Germania [Tacitus in V Volumes]*, translated by William Peterson, Honorary Doctor of Letters in The University of Oxford, Principal of McGill University, (Montreal London: William Heineman, 1914), 205. Tacitus describes the Roman expedition into Britain, with Agricola, in the lead of his column and being "constantly on the march".

[2] Appian, "Book VI, The Wars in Spain," *Roman History in Four Volumes*, English translation by Horace White, (London: William Heineman, 1922), 274. Appian's text describes Scipio Africanus training his men by "many laborious exercises" before engaging the enemy, the Numantines in Spain.

[3] Flavi Vegeti Renati *Epitoma rei militaris (Epitome of Military Science)*, reviewed by Carlus Land (House of BG Press, New York, 1885), 16.

[4] Ibid.

[5] Ibid.

[6] JP 5-0, *Joint Operational Training*, 11 August 2011, IV-8.

[7] "Obama's Shrinking Army," *Wall Street Journal, Review & Outlook*, (28 February, 2014).

[8] CJCS Notice 3500.01, 10 October 2013, 2014-2017 CHAIRMAN'S JOINT TRAINING GUIDANCE. Note: The general theme of the CJSC guidance is one of constraint and hard choices.

[9] Based on observations of the author, gleaned in student inputs during Command General Staff College class discussion.

[10] For a full review of EAGLE CLAW, see the *Holloway Report* on the US Navy website, online at http://www.history.navy.mil/library/online/hollowayrpt.htm; accessed on 1 June 2014.

[11] The American Presidency Project, President Dwight D. Eisenhower, #65 "Special address to Congress," regards reorganization Department of Defense," April 3, 1958. Online at http://www.presidency.ucsb.edu/ws/?pid=11340; accessed on 9 June, 2014.

[12] Ibid.

[13] Barry Goldwater (AZ), "Goldwater-Nichols Department of Defense Reorganization Act of 1986," 1986 The Congressional Record 99-433 S9800 (7 May, 1986).

[14] US Air Force Fact Sheet, "THE MAYAGUEZ INCIDENT" posted on the US Air Force Historical Studies Office website (August 19, 2013) provides a decent and concise explanation of the events that led to the capture and release of this American cargo ship and her crew, online at http://www.afhso.af.mil/topics/factsheets/factsheet_print.asp?fsID=20956&page=1; accessed 3 June, 2014.

[15] For an excellent, although slightly redacted overview of Operation URGENT FURY, see the Department of Defense website, on line at http://www.dod.mil/pubs/foi/International_security_affairs/grenada/181.pdf.

[16] The "Goldwater-Nichols Act" is codified as Public Law 99-433 with the actual short title: "Goldwater-Nichols Department of Defense Reorganization Act of 1986". To see the law in full, go to the Government Printing Office website; online at http://www.gpo.gov/fdsys/pkg/STATUTE-100/pdf/STATUTE-100-Pg992.pdf; accessed on 15 May, 2014.

[17] President Barrack Obama, *US Leadership: Priorities for 21st Century Defense*, January 2012.

[18] CJCS Notice 3500.01, *CHAIRMAN'S JOINT TRAINING GUIDANCE*, 2014-2017 (10 October 2013). 1.

[19] Howard Altman "Two Major MacDill Commands Winners in New Budget," *Tampa Tribune*, (4 March, 2014).

[20] Jason Ukman, "US Joint Forces Command formally dissolved," *Washington Post* (4 August, 2011).

[21] Tom Shanker, "US Sends Two B-52 Bombers Into Air Zone Claimed by China," *New York Times* (26 November, 2013).

[22] The 2005 The Base Realignment and Closure, or BRAC, Commission is authorized by Congress through the Defense Base Closure and Realignment Act of 1990 (P.L.101-510), as amended. For a concise description and history of the Commission see the BRAC Commission online at http://www.brac.gov/About.html; accessed on 3 June, 2014.

[23] Capt. Robert Sperling, USAF, "Joint Base Andrews Naval Air Facility Washington unveiled," *316th Wing Public Affairs* (Posted & Updated, 2 October, 2009); online at http://www.andrews.af.mil/news/story.asp?id=123170843; accessed 6 June, 2014.

[24] Sgt. 1st Class Doug Sample, USA, "Transforming Training Not Easy, Officials Tell House Committee," *American Forces Press Service*, (19 March, 2004).

[25] Maj General Charles J. Dunlap, Jr., "Understanding Airmen: A primer for Soldiers," *Military Review* (31 October, 2007).

[26] CNO's Sailing Directions, US Navy homepage, online at http://www.navy.mil/cno/cno_sailing_direction_final-lowres.pdf; accessed on 10 June, 2014.

[27] CJSC Notice 3500.01. A-1.

[28] Eric R. Sterner, "Space in the National Interest: Security in a Global Domain," *The American Foreign Policy Council – Defense Technology Program Brief, No 3. Washington DC* (April, 2014). 7.

[29] Eric R. Sterner, "Ceding The Next Battlefield," *The Journal of International Security Affairs* no. 23, Fall/Winter 2012.

[30] CJSC Notice 3500.01. A-1.

[31] Eisenhower, Dwight D., *At Ease: Stories I Tell My Friends* (Doubleday & Company, Inc., Garden City, New York, 1967), 203.

[32] These new terms were introduced into JP 5-0, *Joint Operational Planning*, with issuance of the 11 August 2011 edition.

[33] The "wicked problem" concept was introduced in 1973 by Horst W. J. Rittel when he was Professor of the Science of Design, University of California, Berkeley. That same year he co-authored with Melvin M. Webber, Professor of City Planning, University of California, Berkeley, *Dilemmas in a General Theory of Planning*. The paper contains a list entitled "ten distinguishing properties" of wicked problems, the first one being "There is no definitive formulation of a wicked problem", located online at http://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General_Theory_of_Planning.pdf; accessed on 9 June, 2014.

[34] The American Presidency Project, Dwight D. Eisenhower, #235 — Remarks at the National Defense Executive Reserve Conference, November 14, 1957, online at http://www.presidency.ucsb.edu/ws/?pid=10951; accessed on 29 May, 2014.

[35] Ibid.

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UK JOINT TRAINING IN A RESOURCE CONSTRAINED ENVIRONMENT

By Cdr Ken Barlow, Royal Navy (United Kingdom)

INTRODUCTION

Throughout the North Atlantic Treaty Organization (NATO), the impact of austerity measures is affecting almost every aspect of military activity. With equipment and personnel costs consuming the majority of each nation's defence expenditure, it is not surprising that training resources temptingly offer the "low hanging fruit" to deliver savings. Against this background, the United Kingdom (UK) Joint Air Land Organisation (JALO) is responsible for promoting Air/Land Integration (ALI) across UK Defence, recently led the re-invigoration of Air/Maritime Integration (AMI), and is the UK lead for joint terminal attack controller (JTAC) issues. JALO is, therefore, a key contributor to the joint training environment. This short article aims to provide the JALO perspective on how it is attempting to mitigate the impact of reduced resources on the delivery of joint training.

With equipment and personnel costs consuming the majority of each nation's defence expenditure, it is not surprising that training resources temptingly offer the "low hanging fruit" to deliver savings.

ESTABLISHING THE JOINT TRAINING REQUIREMENT

The UK has used the reset to contingency following Afghanistan operations to develop the UK Joint Expeditionary Force (JEF) concept. This concept requires sufficient forces at readiness as defined by the Contingent Capability Requirements and Standards (CCRS) process. This process defines what the JEF should be prepared to do in support of contingent operations but, most importantly, it aims to link operational level Military Tasks to Force Element (FE) training objectives—a "golden thread" linking strategic direction to tactical activity.

However, while the CCRS process defines the required training objectives, these can have a single Service focus and, therefore, lack emphasis on joint training; the latter is arguably the glue that will deliver a cohesive JEF. The UK had already developed ALI Collective Training Objectives (CTOs) which were used to develop Afghanistan mission specific training for elements of both the air and land components. Recently, JALO was tasked to re-invigorate AMI which had suffered with the land focus in Iraq and Afghanistan. The AMI work led to the development of a detailed joint mission task list and subsequently a prioritised list of AMI CTOs across the specific warfare disciplines. The upshot is that the UK has a mature view of what the single Service and joint training requirements are for the future contingent environment.

JOINT TRAINING COORDINATION

Given the joint training requirement, the next step is to deliver the forces at readiness through effective training; but equally in the most efficient manner possible within resource constraints. The last point is key. It

Her Majesty's Ship (HMS) Illustrious is pictured at speed in the English Channel on June 10, 2013. HMS Illustrious was the UK's High Readiness Helicopter and Commando Carrier. It fulfilled multiple taskings demanded by higher authority. It carried helicopters (such as, Merlin, Sea King, Lynx, and Apache) and Royal Marines Commandos. It was decommissioned August 28, 2014. (Photo by PO Ray Jones, UK Royal Navy)

is almost untenable to have front-line forces supporting events as a non-training audience; training should be designed such that all participants enjoy mutual benefit. As a result, JALO has developed a Joint Operational Support to Training Agreement (JOSTA) which allows the single Services to prioritise their training requirements that rely upon cross domain support. This agreement encompasses live and synthetic training activities as well as the augmentation requirements for subject matter expert (SME) and liaison personnel. JOSTA planning occurs in detail out to 12 months and outline for the subsequent 12 months. This is facilitated through regular meetings which agree that a resourced and prioritised joint support plan should be fully aligned with the strategic force generation requirements. This close dialogue has also exposed untapped opportunities for joint training from existing single Service activities. Whilst the UK Joint Forces Command remains the custodian of the JOSTA and the associated process, the agreement is signed by the single Services with detailed coordination and execution remaining a collaborative effort between them.

JALO has also recognised the requirement to improve the coordination of JTAC training to offset potential shortfalls as air assets become scarcer. A process is therefore being developed which will see individual JTAC units developing training plans with a central coordination process that puts JTACs and air assets together, whether as part of a formal exercise, as additional elements to pre-planned JTAC concentrations, or through other opportunities such as providing JTACs to support air training. This initiative has an important part to play in ensuring the efficient use of the scarce resource but also requires a clear view on the currency of the JTAC cadre so training can be targeted appropriately.

CONCENTRATIONS

Concentrations represent a relatively simple means of focussing forces to deliver mutual training, while maximising resource utilisation. Joint exercises offer a form of concentration with the UK's premier Joint exercise being the biannual exercise, Joint Warrior. Facilitated and orchestrated by the Joint Training and Exercise Planning Staff (JTEPS), Joint Warrior attracts a wide range of NATO participants, providing a common vehicle to train and validate a range of participants from two star Command Headquarters down through tactical forces, to individual training.

...a resourced and prioritised joint support plan should be fully aligned with the strategic force generation requirements.

Unidentified Royal Air Force Regiment forward air controllers from the Air Land Integration Cell, Based at Royal Air Force Honington (Suffolk, United Kingdom), guide a Typhoon aircraft from 6 Squadron onto their target at the Cape Wrath practice range in Scotland, March 29, 2013. (Photo by Sgt Andy Walker, Royal Air Force)

The UK employs the same principle for close air support (CAS) and JTAC training. Prior to the UK's involvement in Afghanistan, JTAC concentrations were used to provide dedicated periods of focussed activity where arguably better quality training could be achieved more efficiently and with increased assurance of support. With JTAC generation for Afghanistan complete, it is an apposite time to review and possibly refresh the previous model. Trials have been conducted to ascertain the effectiveness of conducting JTAC concentrations in the UK's synthetic hub at the Air Battlespace Training Centre (ABTC) at RAF Waddington. Initial results are highly encouraging, including the increased benefits of complex scenarios, and collocated briefing and debriefing for aircrew and JTACs, and a dedicated and highly qualified white force to facilitate and assure the quality of the training.

SYNTHETIC TRAINING

Synthetic training offers a real opportunity to deliver high quality joint training when resources are reducing. Early recognition of the need to incorporate joint synthetic training into the JOSTA process and agreement have been important. Synthetics should no longer be seen as the "poor man's live training" and in many areas, can be more effective than the equivalent live training. From the JTAC perspective, it could be argued that using live munitions on weapons ranges is of limited training value given the effectiveness of precision weapons and the often limited range procedures, including lines of attack, target sets, and target positions relative to observation posts. As an alternative, a far more complex synthetic scenario with multiple assets could provide a much more demanding training event and require a fraction of the resources associated with live training.

Synthetics should no longer be seen as the "poor man's live training" and in many areas, can be more effective than the equivalent live training.

The fundamental questions when considering synthetic systems are: what do you currently do live that can be performed more effectively in the synthetic environment and conversely, what must you do live that you cannot do synthetically? There are clear cultural barriers to overcome if we are to exploit the full spectrum of synthetic capabilities and reach the optimum 'live synthetic blend'. Realistically, without a 'synthetic dividend', it is always going to be difficult to make the case for sufficient investment in synthetic systems. However, the reality is that, at some point, synthetics must replace some live training and not just supplement it. A joint synthetic training strategy is, therefore, essential to provide coherence to the development of single-Service synthetic systems. The use of synthetics also comes with other challenges, such as the rate of development of technology compared to the length of the procurement cycle. Equally, organisations are seduced by the conceptual Nirvana of networked simulation but often struggle to identify the real requirement for linking

An unidentified Apache helicopter pilot concentrates on simulator screens during training on the Aviation Command and Tactics Trainer (ACTT) located at Middle Wallop in Hampshire, United Kingdom, November 14, 2012. The ACTT is used by the Army Air Corps (and occasionally other armed forces) for procedural mission command training of pilots at crew, flight, and subunit levels. (Courtesy photo)

synthetic systems, when faced with an effective 'sweet-shop' of potential options. The paradigm should be that simulators do not necessarily need to be networked now; a "fitted-for-but-not-with" approach may be an expedient interim to allow the systems to be fielded rapidly.

Apache helicopter pilots concentrate on simulator screens during training. The Aviation Command and Tactics Trainer (ACTT) located at Middle Wallop in Hampshire is used by the Army Air Corps and occasionally other armed forces for procedural Mission Command Training of pilots at crew, flight and sub-unit levels.

CONTRACTOR SUPPORT

For a long time, contractor support has been used to support defence training, including target towing, EW, and threat simulation. Such support is often centrally coordinated to ensure efficiency and parity of apportionment. The reset to contingency involves the wholesale regeneration of full spectrum warfare skill-sets, some of which have been maintained at lower levels of readiness and capability. For example, CAS training and readiness have been the predominant skill set among our combat air attack fleet at the expense of more complex deep attack and air interdiction requirements. Rebalancing training to deliver full spectrum capabilities, coupled with a reduction in aircraft fleet sizes, will leave a deficit which will need to be addressed if all skill sets are to be maintained. This is particularly evident for JTAC training. While training coordination and the increased use of simulation and concentrations are partial solutions, the additional live training also can be fulfilled by contract CAS providers. Thus far, Contract CAS has proven to be a reliable and effective backfill, particularly when providing full motion video as a means of offsetting the lack of front-line assets with advanced targeting pods. However, as demand for contract CAS increases, we need to provide incentives to industry to persuade them to innovate and invest in improved capabilities. Live (training) ordnance, laser and night capabilities represent potential growth areas.

CONCLUSION

Delivering joint training in a resource constrained environment is no small undertaking as military forces contract. That said, by understanding the requirement, there are options available for mitigating shortfalls with the focus being on using what is available more efficiently. The challenge will be to develop these mitigations while retaining the quality of training.

The reset to contingency involves the wholesale regeneration of full spectrum warfare skill sets,

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IMPROVING JOINT FIRES PERFORMANCE WITH DISTRIBUTED LIVE/VIRTUAL ENVIRONMENTS

A German Air Force Tornado, assigned to the German Air Force Flying Training Center at Holloman Air Force Base, New Mexico approaches ground training targets during the live-fly Bold Quest 14.2 exercise May 15, 2014. The exercise took place May 3-22, 2014. (Photo by Staff Sgt. Joe Laws, USAF)

By Emilie A. Reitz and Kevin Seavey

Joint terminal attack controllers (JTACs) play a crucial role in a safe and effective integration of air and ground operations. They occupy a position in joint and coalition military Services that is representative of many military skill sets (i.e. highly qualified individuals performing a critical set of tasks requiring regular recertification). The Soldiers and Airmen performing these tasks must adapt their decisions quickly in response to time-sensitive changes in the battlefield and disposition of friendly and enemy forces. The precise provision of close air support (CAS) has been a feature of warfare since the advent of aircraft. The continued development of the JTAC skill set has decreased the risk associated with combining air and ground forces. To be certified as a JTAC, a Soldier or Airman must have at least one year experience in fires or air operations prior to training, complete a course of instruction at an accredited JTAC schoolhouse, have at least 12 successful controls under the supervision of a qualified instructor, and complete an initial evaluation. The yearly requalification process is equally stringent.[1]

The ability to maintain an adequate population of qualified JTACs is constrained by the availability of live aircraft, range access, and equipment.

THE ONGOING CASE FOR JTAC VIRTUAL TRAINERS

The ability to maintain an adequate population of qualified JTACs is constrained by the availability of live aircraft, range access, and equipment. In response to financial and through-

put pressures, and increased demands for qualified individuals able to perform these complicated tasks, simulation based training capabilities have been approved as providing credit for live aircraft controls[2], controls performed on accredited trainers may replace two controls every six months[3].

Further developments to expand the ability to train JTACs are required. Bold Quest, the joint staff-led coalition capability demonstration and assessment event, provides a repeatable mechanism for multi-national, multi-initiative capability development and testing in a coalition operational context. Bold Quest 14.2 (BQ14.2), conducted in May 2014 at White Sands Missile Range (WSMR) and Holloman Air Force Base, New Mexico provided an opportunity for experimentation and assessment of live, virtual and constructive (LVC) training capabilities, building on three years of live and virtual environment development during Bold Quest[4].

MIXED LIVE AND VIRTUAL TRAINING: LIVE JTAC—VIRTUAL AC-130 VIGNETTE

During BQ14.2, we demonstrated and assessed a live JTAC team controlling a virtual AC-130 aircraft during a three-day field experiment, as one small step toward creating a truly LVC environment. The AC-130 was selected due to it being a "high demand, low density" platform that most JTACs have little opportunity to work with prior to deployment. The JTAC team was located on the range at WSMR with support from a live Predator unmanned aircraft system (UAS) providing full-motion video downlink to the JTAC. Command and Control (C2) for the event was to be provided from an Air Support Operations Center. Additionally, during one of the three days, this mixed live and virtual vignette was to be augmented by a quick reaction force (QRF) mission conducted by 1st Armored Division. During the QRF mission, the JTAC team

Two unidentified German Air Force joint terminal air controllers (JTACs), assigned to the Air Control Operations Center in Kalkar, Germany, conduct training inside the Advanced JTAC Training System May 7, 2014. Their training took place during Bold Quest 14.2 held on Holloman Air Force Base, New Mexico May 12-22, 2014. Nearly 800 military and civilian personnel from eight partner countries traveled to Holloman to test the real-world integration of their close air support equipment and personnel. (Photo by Staff Sgt. Joe Laws, USAF)

United States Marine Corps Capt Brent Olsson, with 2nd Air Naval Gun Fire Liaison Company stationed at Camp Lejeune, North Carolina, uses a PRC 152 radio to send ground-target information to coalition aircraft (not pictured) during the-live fly portion of Bold Quest 14.2 on May 15, 2014. Bold Quest 14.2 was held on Holloman Air Force Base, New Mexico May 3-22. . (Photo by Staff Sgt Joe Laws, USAF)

came under attack from opposition forces (OPFOR) and required extraction by helicopter. Additional live forces were added to support this mission, including attack and transport helicopters (i.e. AH-1D, UH-60, and CH-47), a Platoon (minus) of QRF mounted on the transport helicopters, and a squad-sized element of dismounted OPFOR. The QRF and OPFOR on the ground were equipped with instrumentation.

The objective during this event was to make all interactions between the live and virtual participants valid (i.e., sensing, targeting, engagement, and C2).

JTAC teams consisted of a conventional United States (US) Air Force team on day one; an Air Force Special Operations Command team on day two; and a JTAC team from the Australian Army on day three. During their time at the observation post (OP), the JTAC teams were scheduled to control live aircraft too; so their mission preparation, equipment, and mindset were closely aligned to live training. The austere environment at WSMR also ensured that the JTAC teams had to deal with mid-May desert temperatures, bright sunlight, and gusting winds. The only planned virtual participant was the AC-130 Virtual Call for Fire Trainer, provided by U.S. Special Operations Command's Joint Training Support Center at Hurlburt Field, Florida.

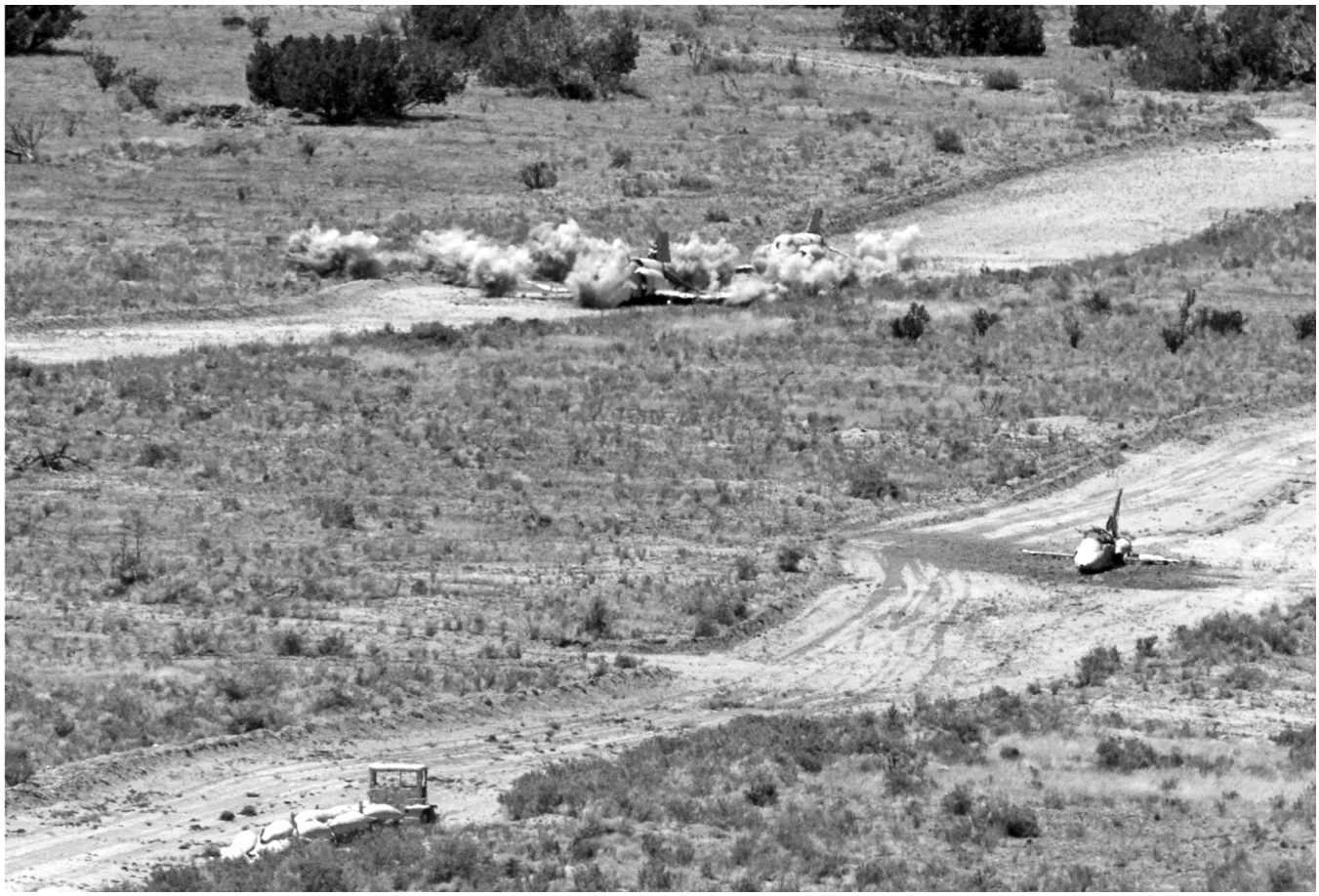
The objective during this event was to make all interactions between the live and virtual participants valid (i.e., sensing, targeting, engagement, and C2). This meant the JTAC and the AC-130 had to see the targets (fixed site and dismounted infantry), locate them with enough precision to engage, and communicate air-to-ground to coordinate and execute joint fires. Our intent was to support these actions via a full motion video downlink from the supporting live UAS; instrumentation from the JTAC team, QRF, OPFOR, and fixed targets; and an interface device provided by Advanced Simulation Technology, Inc. that bridged transmissions from live radios to the virtual gunship at Hurlburt.

Due to limitations in the instrumentation systems available, we were unable to represent weapons effects on the targets. All missions with the AC-130 occurred during the day rather than the more tactically correct night time. Regardless of these limitations, the experiment was successful in collecting data sufficient to make some preliminary judgments and adjustments to future events, the results of which will be included in the BQ 14.2 report.

We found training with a platform like the AC-130 is valuable, even with the limitations of our experiment construct. Interactions between JTAC and virtual AC-130 appeared to be realistic, to the extent that when one JTAC team received an on-station call from a live aircraft during a mission with the virtual gunship, the JTAC immediately deconflicted the live aircraft's altitude with that of the virtual aircraft. We were unable to provide a representation of the virtual environment for the JTAC to perceive using standard tools, such as binoculars, laser range finder or other optics. If we had been able to show the location of an approaching virtual OPFOR unit via a live video downlink, the JTAC would still not have been able to look up and see anything. Weapons effects on the targets should have been provided to the JTAC to support decision making about reengaging the target. As one participant stated, "the fidelity and effects on the ground need to be realistic. Real aircraft make real mistakes; this is essential for a JTAC."

"...the fidelity and effects on the ground need to be realistic. Real aircraft make real mistakes; this is essential for a JTAC."

Smoke and dirt are thrown into the air after several MK 76, air-to-ground training bombs are dropped from an F/A-18 Super Hornet (not pictured) May 15, 2014. The F/A-18 is assigned to the Marine Fighter Attack Squadron (All-Weather) 225, Marine Corps Air Station Miramar, California. This event took place during the live fly portion of Bold Quest 14.2 held on Holloman Air Force Base, New Mexico from May 3-22. (Photo by Staff Sgt Joe Laws, USAF)



This photo shows effects on target (puffs of dust) after an F/A 18 Super Hornet (not pictured) drops MK 76 training bombs during the live-fly portion of Bold Quest 14.2 on May 15, 2014. The F/A-18 is assigned to the Marine Fighter Attack Squadron (All-Weather) 225, Marine Corps Air Station, Miramar, California. Bold Quest 14.2 took place on Holloman Air Force Base, New Mexico May 3-22, 2014. (Photo by Staff Sgt Joe Laws, USAF)

RECOMMENDATIONS

Augmented reality technology has the potential to be a key component of the solution to providing bidirectional interoperability between live and virtual participants.

While delivering the virtual environment to a live warfighter is a challenging problem, the deficiency we describe here is relatively common in today's LVC training[5]. However, we see several areas that show promise for improving JTAC training, but need additional research and analysis before implementation.

Based on data collected during the last two Bold Quest events, we see augmented reality as a potential means to close the gap in LVC capabilities. Representing many of the best aspects of live and virtual training, augmented reality allows a JTAC to train at a live range in actual weather with real equipment, yet still enjoy the many advantages of virtual training. There is no need for live aircraft, weapons, or OPFOR. Providing regular training with live aircraft, weapons, and OPFOR will become harder as resources decrease and could degrade the ability to keep JTACs trained for the next conflict. Augmented reality technology has the potential to be a key component of the solution to providing bidirectional interoperability between live and virtual participants. While augmented reality technology is still relatively immature, the augmented reality technology demonstrated at BQ14.2 is evolving rapidly and has tremendous potential to contribute to the creation of more fully integrated LVC environments. Nine participants who used the system completed a post-use survey. They rated it an average of 4.5 (strongly agree) in response to the question, "Other personnel in my unit could benefit from this capability as it is." Future Bold Quest events will serve as venues to more thoroughly examine how augmented reality can contribute.

Another consideration is that one of the deficiencies in joint CAS

identified as far back as 2003 is the limited opportunity for ground and air forces to train together in a joint environment[6]. While we have come a long way since then, especially in our use of simulation to maintain JTAC currency, it is still difficult to compose simulation systems into an integrated joint fires team-training capability. The JTAC memorandum of agreement states that "JTACs should satisfy their qualification requirements with ground maneuver units and JFO/FAC(A) [joint fires observer/forward air controller (airborne)] integration whenever possible". [7] While most simulators are built to enable distributed simulation, there are still many nuanced incompatibilities between simulators that are obstacles to building team training capabilities. Past Bold Quest events have explored aspects of this challenge, but there is more work to do. One way to move forward in creating these complex training environments is to investigate the use of accredited JTAC simulators integrated with other LVC training capabilities to improve joint fires team performance. Establishing the optimum mix of simulation tools across the spectrum of JTAC training (i.e., initial certification, currency maintenance, and integrated team training) deserves further experimentation and assessment.

ACKNOWLEDGEMENTS

This work was supported in part by the US Joint Staff (Contract #W91247-11-D-0010-2B03). The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of the US Joint Staff or the US Government. The US Government is authorized to reproduce and distribute reprints for Government purposes.

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ADVANCING DISTRIBUTED AND BLENDED LEARNING FOR INCREASED ACCESS AND EFFICIENCIES IN JOINT TRAINING

An unidentified military member completes individual prerequisite training on Joint Knowledge Online web site during PANAMAX 12, August 3, 2012. (Courtesy Photo)

By Nancy Russell

"In fiscal year 2015 and beyond we need to implement a new model that accounts for fiscal realities, provides scalable options, and prioritizes exercise support in line with the Department's priorities. Our focus must be on the consideration of cheaper training modes and the use of distributed joint training enablers to achieve multiple cross-CCMD joint training objectives." (This is an excerpt from *CJCS Notice 3500.01; 2014-2017 Chairman's Joint Training Guidance,* 10 October 2013.)

INTRODUCTION

Inside the Joint Staff (JS) Directorate for Joint Force Development, J-7 Deputy Directorate Joint Training (JS J-7 DDJT) significant advances are being made to leverage its distributed learning capability and use of blended learning to increase access and efficiencies in joint training. This article highlights the application of advanced learning technologies and science of learning methodology for training courses on Joint Knowledge Online (JKO), and the use of JKO courses and distributed small group scenario training for blended learning training support tailored to augment collective exercises. Distributed and blended learning are lower cost training alternatives gathering momentum in individual, staff, and collective exercise joint training as critical enablers to meet training objectives and learning effectiveness in the current environment of constrained resources.

BACKGROUND

Fielded in 2007, JKO is the office of the Secretary of Defense (OSD) sponsored, Joint Staff managed distributed learning training platform. Chartered as the Joint Knowledge Development and Distribution Capability (JKDDC) of the OSD training transformation initiative, JKO was fielded to "operationalize" the JKDDC charter and training transformation to modernize military training and advance the use of distributed learning programs. With the transition of operational program responsibility to the Joint Staff J-7 in 2011, JKO became the system of record for JS online training requirements in addition to the mission-role of delivering online training for individuals deploying to joint exercises and joint mission operations. For the OSD and JS J-7 DDJT, the JKO Division develops web-based joint training products in response to Combatant Commanders Exercise Engagement and Training Transformation goals and objectives, Chairman Joint Chiefs of Staff high interest training items, and JKO Stakeholder-identified requirements. The JKO training capability delivers global access to required, theater-entry, and self-paced training for individuals to prepare for joint training exercises and joint operations. JKO's training content serves a userbase encompassing military and civilian personnel, multinational, intergovernmental, and interagency individuals involved in joint and coalition operations. JKO training resources include web-based joint courses, special area curricula and immersive simulation training applications delivered on military unclassified and classified networks. JKO reflects continuous growth in utilization as a mature learning content management system with over 1.5M registered users and averaging 85 thousand course completions per month. At the end of May 2014, JKO reported approximately 3.6 million course completions and approximately 17.4 million online training hours delivered.

TECHNOLOGY-BASED TRAINING DELIVERY

The JKO joint content management architecture (JCMA) includes JKO Portal access on military classified and unclassified networks, Learning Content Management System (LCMS), web-based courseware authoring tool, mobile access, and training records linkage to other Department of Defense (DOD) personnel training records systems. The JCMA integrates Government owned software and commercial interface standards for cost effective, global access to web-based training through a standards based, non-proprietary distributed learning capability. The JCMA builds upon the LCMS that administers development and delivery of web-based training, hosting, assignment, enrollment, tracking, and its reporting of online training. JKO increases shared joint content and availability, reduces course development time, enables reuse of digital content, and contributes significantly to the reduction of development and delivery costs.

...the JKO Division develops web-based joint training products in response to Combatant Commanders Exercise Engagement and Training Transformation goals and objectives...

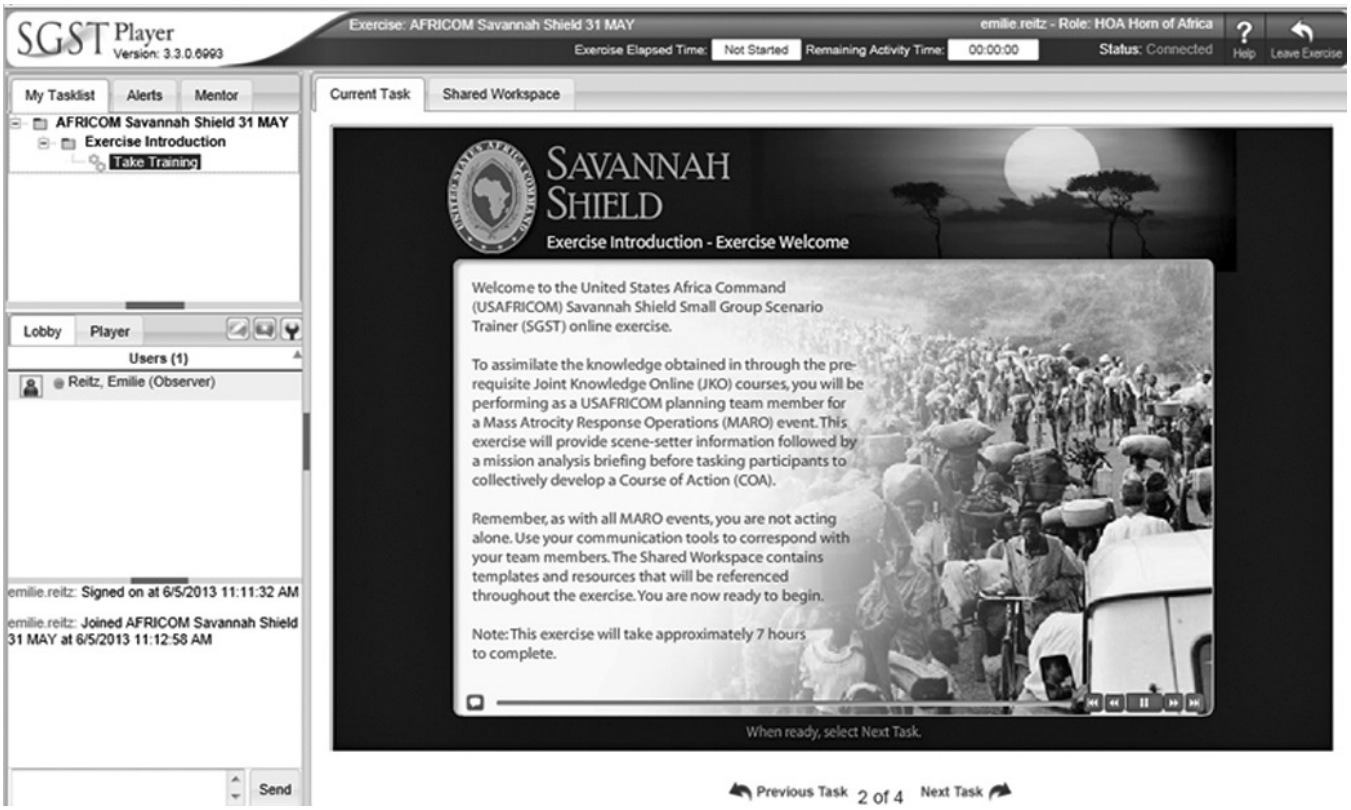
Building on the foundational capability, JKO hosts specialized training applications providing high-level interactivity utilizing immersive, media-rich environments, and desktop scenario-simulation capability for small group training. JKO Virtual Cultural Awareness Trainer (VCAT) web-based courses provide learners with highly interactive, immersive, cultural and language training in simulated operational settings. VCAT courses use a variety of advanced learning techniques including game-based simulations, storytelling, intelligent tutoring, and remediation which learners actively engage to develop operational culture knowledge, language familiarization and interpersonal skills. JKO's Small Group Scenario Trainer (SGST) is a distributed, web-based tool targeting the training gap for members of teams and staffs that need not only individual training, but small group collaborative training focused on staff interaction and processes. An extensive library of SGST scenarios is available for tailoring to area-specific and mission-specific training objectives.

BLENDED LEARNING TRAINING SYSTEM

...Blended Learning Training Packages (BLTPs) are tailored to specific exercise objectives and integrated into the schedule of live training events.

The JS J-7 DDJT introduced the Continuum of eLearning concept in 2011, applying science of learning disciplines to enhance and leverage existing capabilities available on JKO to target cost and performance efficiencies for training exercises. Controlled studies were conducted, from 2011 to 2014, in a variety of training exercises and events to assess acceptance and effectiveness to enhance joint training with lower cost training modes. Over the course of the three years consolidating the concept evolved as the Blended Learning Training System (BLTS) online learning, metrics and assessments, in-resident academics, table top exercises, and distributed small group simulation-based training. Today, study results indicate that participants generally benefitted from pre-exercise online courses and SGST team training, and demonstrate the BLTS as a fully operational capability to support events across the joint training enterprise.[1]

The BLTS framework includes online, self-paced courses with embedded metrics and metric-reporting that supports in-resident academics, distributed small-group simulation exercises to support team-related training, blended live training, instructional design processes, and schedule processes. Based on this framework, Blended Learning Training Packages (BLTPs) are tailored to specific exercise objectives and integrated into the schedule of live training events. A BLTP leverages existing JKO courseware or may entail new development, depending on training topics and specific objectives. JKO BLTP courses begin with a pre-test that enables a customized program of instruction based on the learner's baseline knowledge, maximizing the individuals' time. A post-test is also required, with an opportunity to retake it as many times as necessary, to assure content mastery. Pre-requisite online courses are scheduled to be completed prior to classroom academics. Proficiency metrics from the online courses are captured, analyzed, and



Pictured is a screen shot of the Joint Knowledge Online Small Group Scenario Trainer scenario simulation generated August 5, 2014.

aggregated for the training audience and metrics reports are given to the observer trainers and training managers to assist them in training to knowledge gaps.

A BLTP uses prescribed scenario simulations for staff or small-team training using the JKO-hosted SGST. With SGST participants use desktop computers (such as they would to perform normal staff operations) to form as a team in reacting to realistic interfaces and simulated injects introducing new information as the simulation unfolds. This offers combatant command staffs an opportunity learn basic concepts of joint operations (i.e. planning, coordination, and battle rhythm) and to practice those concepts as a team.

JKO MOBILE

Furthering access to joint training resources, JKO Mobile is a collaborative effort by JKO and the OSD Advanced Distributed Learning (ADL) initiative to leverage the JCMA and mobile technology in common use today to extend delivery of training and performance aids to individuals using mobile devices. Leveraging existing capability and a standards-development approach, JKO and ADL collaborate in the development of mobile architecture components to deliver mobile access to training and ensure downstream interoperability and adoption across the DOD training and education enterprise.

The JKO Mobile capability is enabled by the JKO Mobile App used to download content and synchronize information with the mobile Learning Suite (m-LS) server that manages all mobile content and mobile user information. Mobile content in the m-LS is segregated by public access and personal identification number (PIN) access. United States (US) mobile users obtain a PIN by completing the "Introduction to JKO Mobile" course on the desktop JKO LCMS. Data security is designed into the JKO Mobile architecture. All information is unclassified with no material requiring handling caveats. The only information resident on the mobile device is the student's PIN (that does not use any personally identifiable information) and mobile downloads.

The JKO Mobile App is available in Apple and Android app stores; users search for "JKO" and download the free app to their mobile device. The app can be downloaded to an Apple iPad, iPod, and iPhone and an Android tablet and phone. With the JKO Mobile App, users are able to access the m-LS to download and complete training courses on their personal mobile device. After the user completes a training course on the mobile device and re-establishes connectivity, the training completion record is sent to the m-LS. Course completions in the m-LS synchronize with the JKO desktop system for tracking and reporting for JKO account users (where training transcripts are recorded). Training completion transcripts remain and are accessible in the JKO desktop LCMS. JKO Mobile furthers the reach of lower cost, distributed training to mobile users, and provides convenient and flexible access to training and enables a persistent learning environment opportunity.

The JKO Mobile App is available in Apple and Android app stores; users search for "JKO" and download the free app to their mobile device.

The US Air Force Air Combat Command (ACC) Logistics Learn Mobile App project leveraged the JKO Mobile capability to tailor the "ACC Logistics Learn" free app for Airmen's use in accessing job aids, such as reference material or Air Force instructions. ACC mobile content currently includes instructional videos for six types of aircraft: A-10, F-15, F-16, F-22, HH-60, MQ9 and the mine resistant ambush protected vehicle.

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WARFIGHTER READINESS THROUGH FLAG-LEVEL EXERCISES

By Maj Rick "Ranger" Martino, USAF

The United States Air Force (USAF) Warfare Center, Nellis Air Force Base, Nevada hosts three major Flag-level exercises throughout the year; RED FLAG, GREEN FLAG, and VIRTUAL FLAG. These events offer warfighters the opportunity to hone their skills through integration beyond Service-level defined proficiency training in a joint and coalition environment.

While each of the events is unique, all three offer the same ability to integrate in an environment where mission objectives reign over individual training requirements. Recently, the USAF Warfare Center Commander, MajGen Jay Silveria, provided information to Air Force Global Strike Command, Air Force Space Command, and Air Combat Command Wing Commanders on RED FLAG and GREEN FLAG to meet Combat Air Force training requirements. RED FLAG continues to be "the top venue" that incorporates multi-domain, combat training, with an emphasis in anti-access area denial (A2/AD) scenarios, while GREEN FLAG provides the air-to ground, live fly opportunity shifting to a larger near-peer, force-on-force contested land battle. Rounding out the third event, VIRTUAL FLAG provides warfighters the ability to operate in the Combatant Commander's (COCOM) geographic area of responsibility focused on a specific operations plan (OPLAN) utilizing on-the-shelf documents with the ability to emulate adversary capabilities unrestrained by live range restrictions.

Recently, the 705th Combat Training Squadron, host of Air Combat Command's VIRTUAL FLAG exercise, established a method to trace warfighter readiness training in a way that extends beyond individual training requirements and shows the integration critical to warfighters supporting a COCOM OPLAN. This is first demonstrated through defining tactical proficiency, operational integration, and COCOM execution (figure 1).

Tactical proficiency is best described as the daily training warfighters receive to build and maintain currency in their weapons system (e.g, F-16, E-3, or RC-135).

Tactical proficiency is best described as the daily training warfighters receive to build and maintain currency in their weapons system (e.g, F-16, E-3, or RC-135). Tactical proficiency focuses on the individual's and unit's ability to execute mission tasks. Training is generally focused in small -to medium- scale events with very few

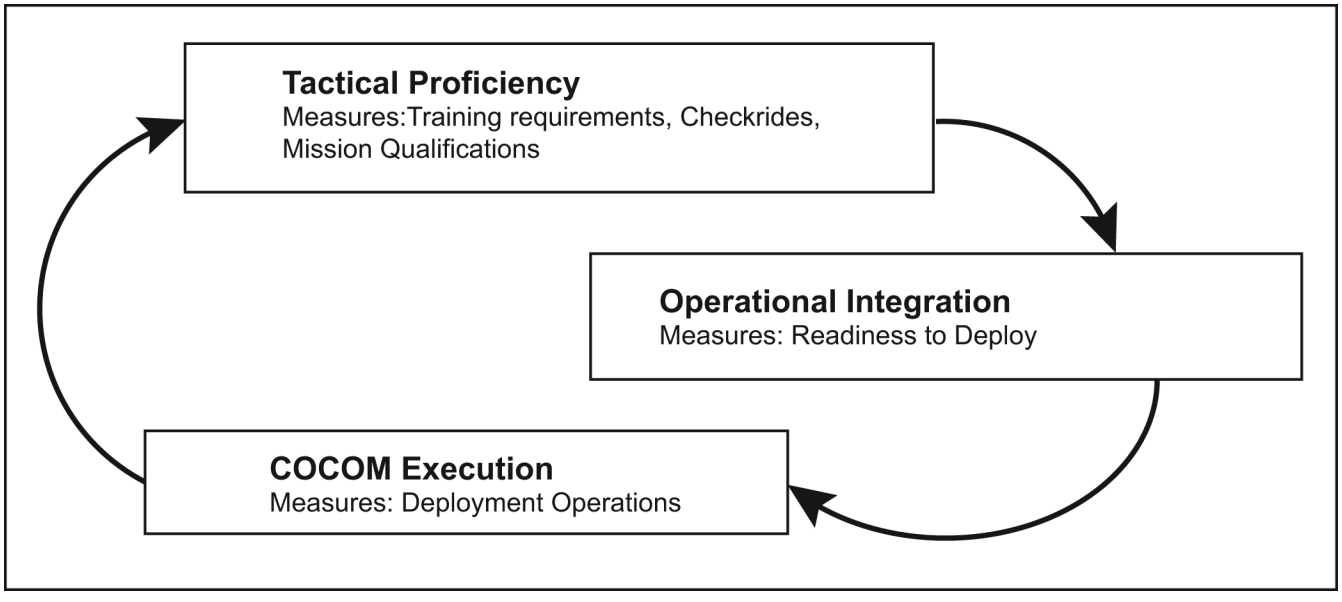

Figure 1. Defining Tactical Proficiency, Operational Integration and COCOM Execution

units participating with an emphasis on unit-level requirements based on training cycles, ready aircrew program requirements, or spin-up training. When two or more units participate together, the focus is integration at a small scale, single mission set such as offensive counter air, interdiction, or personnel recovery. Gaining or maintaining combat mission readiness is generally done through tactical proficiency training. As warfighters progress, operational integration becomes key to their ability to integrate at a higher-level.

The Chief of Staff of the Air Force's USAF Live Virtual Constructive Operational Training Flight Plan states "Operational training is mission-oriented training in support of warfighter readiness. It is a crucial element of all the Air Force core functions. It distinguishes itself from basic/initial training due to its focus on employment of equipment/skills in an operational setting as opposed to learning the basic use of equipment or development of basic skills." During operational integration, while unit objectives are important, the overall focus is a combat representative force in a combat representative environment. Mission sets are conducted simultaneously, requiring the joint/coalition force to meet multiple mission objectives.

Operational integration should not be confused with the operational level of war. However, a key component is tactical warfighters directly interacting with a component commander's command and control (C2) headquarters. This integration ensures the force is capable of understanding roles and responsibilities when faced with decisions over priority of effort. The USAF Warfare Centers' Flag events are the perfect venues to provide such an environment. These flag events are enhanced when elements of existing OPLANs are introduced to the warfighters and high-level training guidance is considered or evaluated during the exercise.

As an on-going effort to define warfighter readiness, the 705th Combat Training Squadron introduced a method to track warfighter operational integration through the COCOM's High Interest Training Requirements (HITR) and the Chairman, Joint Chief of Staff's (CJCS) High Interest Training Issues (HITI) (Figure 2 is an example from Exercise VIRTUAL FLAG.)

CJCS Notice 3500.01, 2014 -2017 Chairman's Joint Training Guidance, 10 October 2013, directs the Services to; focus Joint National Training Capability Service training program accreditation/ certification nominations on tasks that incorporate HITRs that align with the HITIs also, it directs HITRs to focus training and prepare conventional forces for joint employment by the Combatant Command (CCMDs) and incorporate realistic cyber conditions to include robust red team operations (to name a few). The Chairman's guidance includes 12 HITIs which are found in enclosure A, seven of which can be trained to some degree in RED FLAG, GREEN FLAG, and VIRTUAL FLAG. These are joint operational access, cyberspace operations, irregular warfare, information operations, intelligence, surveillance, and reconnaissance, homeland defense/defense support of civil authorities, and integration of special operations forces with conventional forces).

Evaluating warfighter readiness can be further defined by using the COCOMS HITRs (figure 2). This allows exercise planners to incorporate conditions in the exercise that will allow aircrew, exercise staff, and an operations assessment cell to evaluate joint/ coalition force mission success against the COCOM's requirements. COCOM HITRs are not the only sources for providing metrics for operational integration. The universal joint task list, air sea battle office mission essential task list, and multi-Service tactics, techniques and procedures (MTTP) can be used in scenario development, mission execution, and mission debrief.

...a key component is tactical warfighters directly interacting with a component commander's command and control (C2) headquarters.

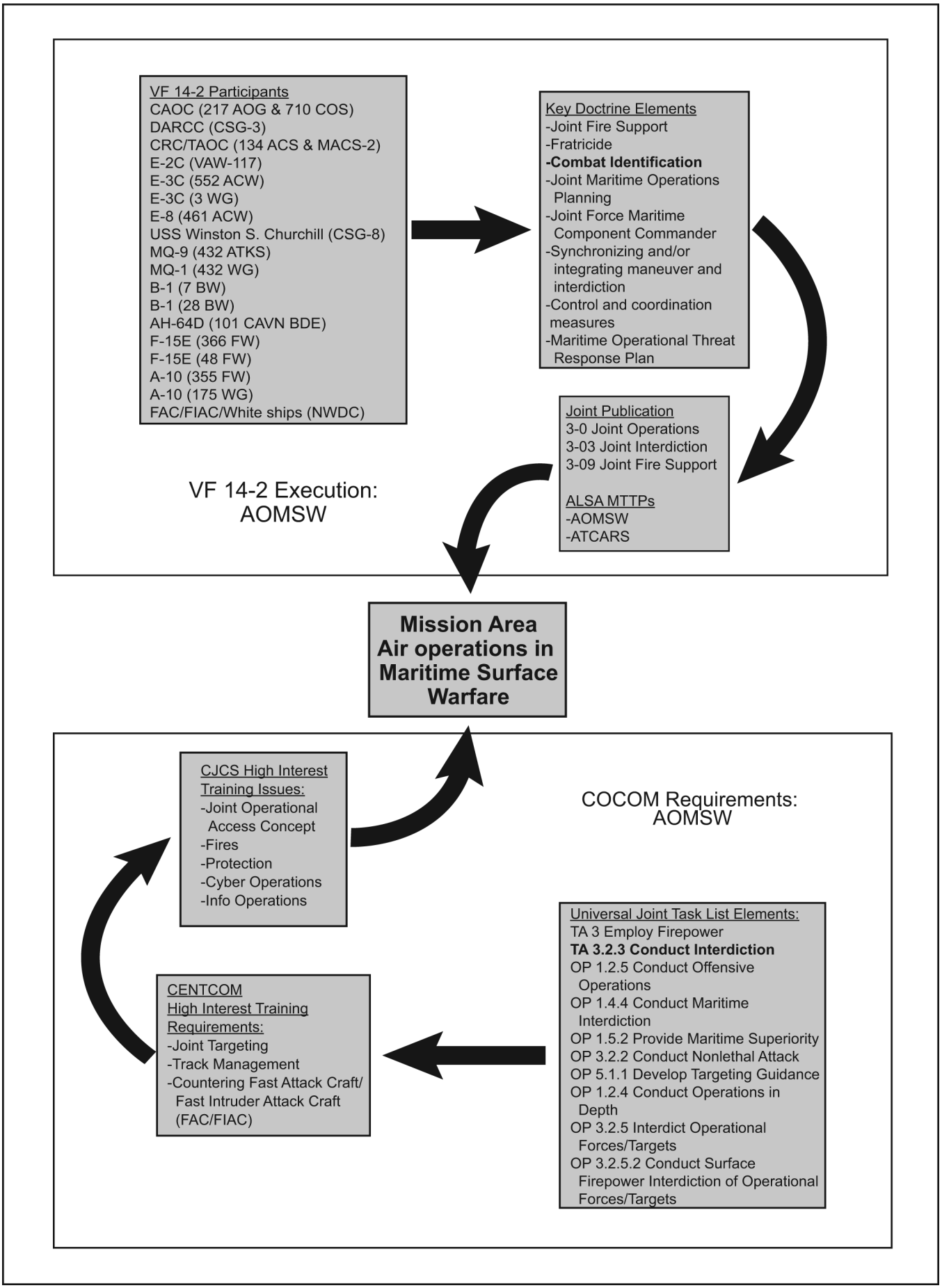

Figure 2. An Example from Virtual Flag Exercise14.2

Tying CJCS HITIs, COCOM HITRS, MTTP and joint doctrine focuses warfighter operational integration at a level beyond unit and service objectives, and forces different mission requirements to compete with limited resources towards a joint forces commander's mission goals.

Figure 3 builds on the power of operational integration as an example, during VIRTUAL FLAG 14-2, a US Central Command (CENTCOM) scenario, over 19 units conducted air operations in maritime surface warfare (AOMSW) together in a synthetic battlespace representative of the environment in which they would operate during combat. In this exercise, Carrier Strike Group 3 provided the maritime C2 consisting of the Carrier Strike Group staff, Dynamic Air Resource Coordination Center, Surface Warfare Commander (XRAY-ZULU), Maritime Air Controller and portions of a US Navy Cruiser/Destroyer Combat Information Center acting as the Air Control Unit. USAF E-3 and E-8 mission crews were assigned as maritime air controllers under Navy C2 while USAF A-10s operated in direct support to the AOMSW fight receiving identification and targeting directly from US Navy ships. Concurrently, integrated air and missile defense, personnel recovery, joint C2, and interdiction were conducted with a force representative of the air tasking order supported by an Air Operations Center Combat Operations Division at Battle Creek, Michigan (217th Air Operations Group).

VF 14-2 AOMSW Participants

CAOC (217 AOG & 710 COS)
DARCC (CSG-3)
CRC/TAOC (134 ACS & MACS-2)
E-2C (VAW-117)
E-3C (552 ACW)
E-3C (3 WG)
E-8 (461 ACW)
USS Winston S. Churchill (CSG-8)
MQ-9 (432 ATKS)
MQ-1 (432 WG)
B-1 (7 BW)
B-1 (28 BW)
AH-64D (101 CAVN BDE)
F-15E (366 FW)
F-15E (48 FW)
A-10 (355 FW)
A-10 (175 WG)
FAC/FIAC/White ships (NWDC)

Figure 3. Virtual/Constructive Participants in an AOMSW Mission Set

While continued focus on tactical proficiency is critical to warfighters combat mission readiness, operational integration in USAF Warfare Center Flag-events provides joint and coalition warfighters the ability to prepare for COCOM OPLAN execution without traveling to the area of responsibility.

Operational integration is the readiness return generated from the integration of a joint/coalition combat representative force, stressed in an A2/AD combat representative environment, concurrently executing multiple COCOM and CJCS combat training requirements that span the operational and tactical levels of war. In short, operational integration is the key to successful deployment operations (figure 1).

...operational integration is the key to successful deployment operations...

Maj Rick Martino is the Director of Operations for the 705th Combat Training Squadron, USAF Distributed Mission Operations Center, Kirtland Air Force Base, NM.

UNDERSTANDING C2 IN THE JOINT ENVIRONMENT

By Capt Joseph Feerst, USAF and Capt Noah Fisher, USAF

"The battlefield is a scene of constant chaos. The winner will be the one who controls that chaos..."

—Napoleon Bonaparte

By promoting joint training, shooters and decision makers help build and apply those tactics, techniques, and procedures (TTP) that better address gaps in the operational and tactical relationship.

Although inherent to military operations on any scale, effective command and control (C2) is fundamentally hard. It is hard because of the unique challenges it faces and the compounding effects of Clausewitz's ubiquitous wartime principles of "fog, friction, and chance" (FFC) in C2 decision making. In this article we will briefly discuss basic functions of C2 before turning our focus to the C2 dilemmas that are the most challenging in a joint and constrained environment. Considering United States forces typically employ in an environment that meet both of these criteria, we aim to foster a general understanding of the C2 dilemmas that are most likely to appear to better overcome them in joint training and operations

THE FUNCTIONS OF C2

Air Force Tactics, Techniques, and Procedures (AFTTP 3-1.TACS)*Theater Air Control System* (TACS) outlines the six core functions of C2 as orienting shooters, pairing shooters, solving problems, speeding decisions, brining order, and producing assessments. Originally formulated by Marshal Mikhail Tukhachevskii (1893-1937) of the Soviet Russian Red Army and further developed by Col John Boyd and Helmuth Von Moltke, the six functions serve an underpinning of the US Air Force's concept of C2. They are not, however, the only descriptions of C2 functions outlined in military doctrine and civilian studies as illustrated in figure [1, 2, 3, 4].

What each of these descriptions of C2 functions has in common is, at least two centers of gravity: decision making and integration (or pairing) of operators and resources. For the sake of a broad understanding of what C2 does, 3-1.TACS provides the most concrete definition and will provide the context to discussing C2 challenges specific to joint training in a constrained environment.

Applying these functions in joint training is critical between those who are specialists in C2 and those who are specialists in employing fires (and airspace). By promoting joint training, shooters and decision makers help build and apply those tactics, techniques and procedures (TTP) that better address gaps in the operational and tactical relationship. There are many exercises that apply this training already (i.e., Red Flag, Virtual Flag, and Ulchi Freedom Guardian). These exercises are offered sparingly, as shown by the recent budget cuts, and train only a select few at a time. With the intensity and vastness of today's conflicts, some C2 operators don't get the opportunity to practice their craft on a regular basis with those who employ fires (i.e., a controller's first time controlling an F-15E happens during Operation ODYSSEY DAWN). To address this, training policy between C2 entities (theater air ground system (TAGS)) and fires elements should require integration (using joint memoranda of understanding, facilities, or resources) whenever possible. By doing this, trust and confidence build for all operators to solve problems and meet objectives in the constrained environment. Besides the environment, there are other characteristics that make effective C2 inherently difficult.

THE 18 DILEMMAS THAT MAKE C2 HARD

C2 decision makers have always struggled with the unique challenges of their craft, particularly once operations have commenced. These C2 dilemmas can be divided into four main classes: human factors, doctrine, TTP, understanding, hard truths, and operation environment obstacles, as shown in figure 2.

Functions of C2 (Military Doctrine)			
3-1.TACS (Tukachevskii/ Boyd/Von Motlke)	AFDD3-30 (referencing old JP1)	ARDP 3-0 "Mission Command Warfighting Function"	NATO C2 Functions
1. Orient Shooters 2. Pair Shooters 3. Solve Problems 4. Speed Decisions 5. Bring Order 6. Produce Assessments	Joint Pub 1 states, "C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission."	"the related tasks and systems that develop and integrate those activities enabling a commander to balance the art of command and the science of control in order to integrate the other warfighting functions"	Decision making Information acquisition-Analysis Sharing and exploitation

Functions of C2 (Civilian Studies)		
2005 Swedish Study	Smalley J (2003) in 2008 British study	Alberts and Hayes (Understanding Command and Control)
"The theory of command and control is founded on a number of related academic areas. The integration of these creates the theoretical basis which allows a commander to understand the function of command and control. That is to master the prerequisite for relevant decisions and their transformation into reality."	• Command and Planning • Communications • System Monitoring • System Operation • Operational Coordination • Navigation and piloting	• Establishing intent (the goal or objective) • Determining roles, responsibilities, and relationships • Establishing rules and constraints (schedules, etc.) • Monitoring and assessing the situation and progress

Figure 1. Functions of C2 from Military and Civilian Doctrine

Classes of C2 Dilemmas			
Human Factors	Doctrine/TTPs/ Understanding	Hard Truths	Reaction to current C2 Voids
• Delegation & Trust • Assessment of Risk vs Payoff • Differentiating Situational Awareness • Human uncertainity • Risk of Misinterpretation vs Urgency of the Message	• Competency Mismatches • Differences in Joint Employment • Multiple Commanders, Different Priorities	• Fog, Friction and Chance • Invisibility & Ambiguity • Speed of War Outpaces Desired Decision Space • Inability to Access Available Intelligence	• Commander's Intent vs Operational Environment • Constant Evolution • Communication • Complexity of Integration • Battlespace Monitoring • Technological Dependence

Figure 2. The Classes of C2 Dilemmas

With doctrine, TTP, understanding, the 2014 ALSA Center publication TAGS multi-Service tactics, techniques, and procedures specifically states, "the TAGS is a tailored system of integrated Service component systems designed, organized, and manned to meet the JFC's [joint force commander's] intent." Figure 3 depicts elements of TAGS. Therefore, this "system of systems" should be encouraged to train together in joint environments. Truthfully, each Service system has varying levels of competency in integrating airspace and fires. For example, the US Navy's, Marine Corps', and Army's approach targeting as decide, detect, deliver, assess compared to the Air Force's find, fix, track, target, engage, assess. Another example is the Navy's composite warfare commander (CWC) concept compared to the Air Force's Air Operations Center AOC. The CWC precept is based on "centralized command and decentralized execution" compared to the Air Force's "centralized control and decentralized execution." These mismatches can become friction points during joint integration because in any major theater of operations, multiple commanders can demand resources and intelligence to meet certain objectives. An example of this is, if the joint force air component commander transfers tactical control of forces to the joint force maritime component commander to supplement a need for persistent C2 and intelligence, surveillance, and reconnaissance coverage in a constrained maritime environment forcing a nontraditionally trained integration of forces.

The operational environment was studied extensively in 2010 by the US Joint Forces Command[5]. In the foreword, General J.N. Mattis (Commander, US Joint Forces Command) identified the importance of overcoming challenges in the operational environment. He said, "every military force in history that has successfully adapted to the changing character of war and the evolving threats it faced did so by sharply defining the operational problems it had to solve."[6] These dilemmas are unintentional obstacles meant to counter the root hard truth of "constant fog and friction of war."[7] Therefore, these types of dilemmas are the most difficult to overcome because the environment (which is constantly studied like weather forecasting) is always dynamic.

Functions of C2 (Military Doctrine)					
USAF (TACS)	USN (NTACS)	USMC (MACCS)	USA (AAGS)	SOF (SOAGS)	Other within TAGS
• JSTARS • AWACS • CRC	• CWC • CATF • CCSG • AEW	• TACC • TAOC • DASC	• CP • FC	• JSOTF • JSOAC • JFE	• JAOC • JOC • MOC

Legend:

AAGS—Army air-ground system
AEW—airborne early warning
AWACS—Airborne Warning and Control System
CATF—commander, amphibious task force
CCSG—commander, carrier strike group
CP—command post
CRC—control and reporting center
CWC—composite warfare commander
DASC—direct air support center
FC—fires cell
JAOC—joint air operations center
JFE—joint fires element
JOC—joint operations center
JSOAC—joint special operations air component
JSOTF—joint special operations task force
JSTARS—Joint Surveillance Target Attack Radar System
MACCS—Marine air command and control system
MOC—maritime operations center
NTACS—Navy tactical air control system
SOAGS—special operations air-ground system
TACC—tactical air command center
TACS—theater air control system
TAOC—tactical air operations center (USMC)

Figure 3. Air Land Sea Application (ALSA) Center TAGS Elements

"In the midst of chaos, there is also opportunity."
–Sun Tzu, The Art of War

Conclusion

FFC clouds the commander's execution of intent through C2. As the commander of Apollo 13 Jim Lovell, could not solve the C2 problems crippling his spacecraft without the assistance (integration) and resources in Mission Control. The greater the situational awareness (SA), provided from C2 systems, the greater decision superiority the commander has during the fight.

The four main classes of dilemmas) categorize the reasons C2 is challenging. The 18 dilemmas shown in figure 2 are just significant examples (and by no means the only examples) of how FFC can cause problems in a constrained environment. These dilemmas can ultimately cause the commander to have reduced SA and experience shortfalls in meeting objectives. In reality, a separate paper should be written on each dilemma, its shortfalls, and required fixes. For operators and commanders, the scope of understanding what makes C2 hard becomes overwhelming from the four main classes and their individual dilemmas.

When any team or resource is forward deployed (including those at the tactical level) in a contested environment and assumes responsibility of delegated C2 authorities; it eases the burden of the commander by accomplishing integration of operators and resources through C2 functions. In joint training for C2, knowledge through experience and integration will lead to operational knowledge superiority and; subsequently, decision superiority in a constrained environment for the operator[8]. Human operators, at all levels, and environments, within a C2 system of the TAGS, merge art and science to solve the most complex C2 problems and dilemmas utilizing common C2 functions. This happens every day in combat and noncombat settings. When the problem expands beyond the workload of the joint operator in any environment, effective C2 replies with solutions.

The greater the situational awareness (SA), provided from C2 systems, the greater decision superiority the commander has during the fight.

END NOTES

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COMMUNICATING WITHIN THE INFORMATION ENVIRONMENT

By Retired MAJ Kenneth L. Napier, USA

In today's world of instantaneous information, 24-hour news feeds, smart phones, and global social media networks that allow people to share and communicate at the touch of a button, responding with "no comment" is not an option. All methods of traditional communication, including new media venues (social media, email, etc.), are the result of processes beginning with the commander's intent and guidance. This paper focuses on observations and insights I have made over the past four years as a Joint Staff, J7, deployable training team observer-trainer under the Chairman of the Joint Chiefs of Staff exercise program. It delineates a successful process for developing the commander's communication strategy and discusses how synchroning images, actions, and words is an integral part of the process.

The joint training environment often uses the terms strategic communication (SC), commander's communication synchronization, and commander's communication strategy interchangeably.

The joint training environment often uses the terms strategic communication (SC), commander's communication synchronization, and commander's communication strategy interchangeably. These terms are frequently misunderstood and inconsistently applied during planning efforts. The *Department of Defense (DOD) 2006 Quadrennial Defense Review Strategic Communication Execution Roadmap* for FY 2008-2013 defines SC as, "Focused United States Government (USG) processes and efforts to understand and engage key audiences to create, strengthen, or preserve conditions favorable to advance national interests and objectives through the use of coordinated information, themes, plans, programs, and actions synchronized with other elements of national power."

SC is how the USG communicates within the information environment (IE), however, military commanders create communication strategies within their planning efforts, aligning and nesting them with higher headquarters' guidance. Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms*, does not define communication synchronization or communication strategies. The *Commander's Handbook for SC and Communication Strategy V-3.0*, written by US Joint Forces Command in 2010, defines the commander's communication strategy as, "The commander's strategy for coordinating and synchronizing themes, messages, images and actions to support SC related objectives and ensure the integrity and consistency of themes and messages to the lowest levels." Synchronization is an integral part of this definition, not a separate process. I believe Department of Defense (DOD) should rescind the term "communication synchronization" because commanders will provide their guidance and intent to their staffs, who in turn, conduct synchronization and deconfliction of lethal and nonlethal effects from the strategic to tactical levels of military operations. Words have meaning. Note, each definition contains the word communication, not communications; this is a process, not a simple, single message.

The Services have widely misunderstood and misapplied the concepts of SC, commander's communication strategy, and synchronization. Let us begin with the difference between SC and commander's communication strategy. The term "strategic" in SC elevates it to the strategic level. As the concept evolved, it became necessary to create a new term, which made SC operational, transitioning the concept from the national, strategic, and Office of The Secretary of Defense-levels down to the military theater strategic- , operational- , and tactical-levels. Following this evolution, the commander's communication strategy was introduced and nested

within the USG's intent as it applies in the commander's area of responsibility. Figure 1 represents the alignment and nesting of themes and messages from the tactical to the strategic level in support of an integrated strategic communication strategy among USG agencies, international partners, and coalitions. It finally transitioned to information engagements at the lowest tactical levels, where the commander's communication guidance and intent are executed.

Commanders initiate their communication strategy process by providing their guidance and intent at the beginning of the operational design phase or concept development, which subsequently enhances and focuses their staff's planning efforts during the planning process. Recent operations underscore the need for leadership's familiarity with the IE and developing a commander's communication strategy to influence the hearts and minds of the local community and the global audience; creating support for operations. Staffs gain a common understanding of the IE by engaging in dialogue with senior leaders and stakeholders. An effective commander's communication strategy aligns lethal and nonlethal activities with the overall mission objectives, strategy, and intent. A synchronized approach to lethal and nonlethal actions across all levels of planning is inseparable from the development of design and planning phases. This is why nesting within the SC process is so important; military actions can have international impact.

An effective commander's communication strategy aligns lethal and nonlethal activities with the overall mission objectives, strategy, and intent.

Figure 2 emphasizes the need for commander driven guidance and intent based on the commander's communication strategy from higher headquarters.

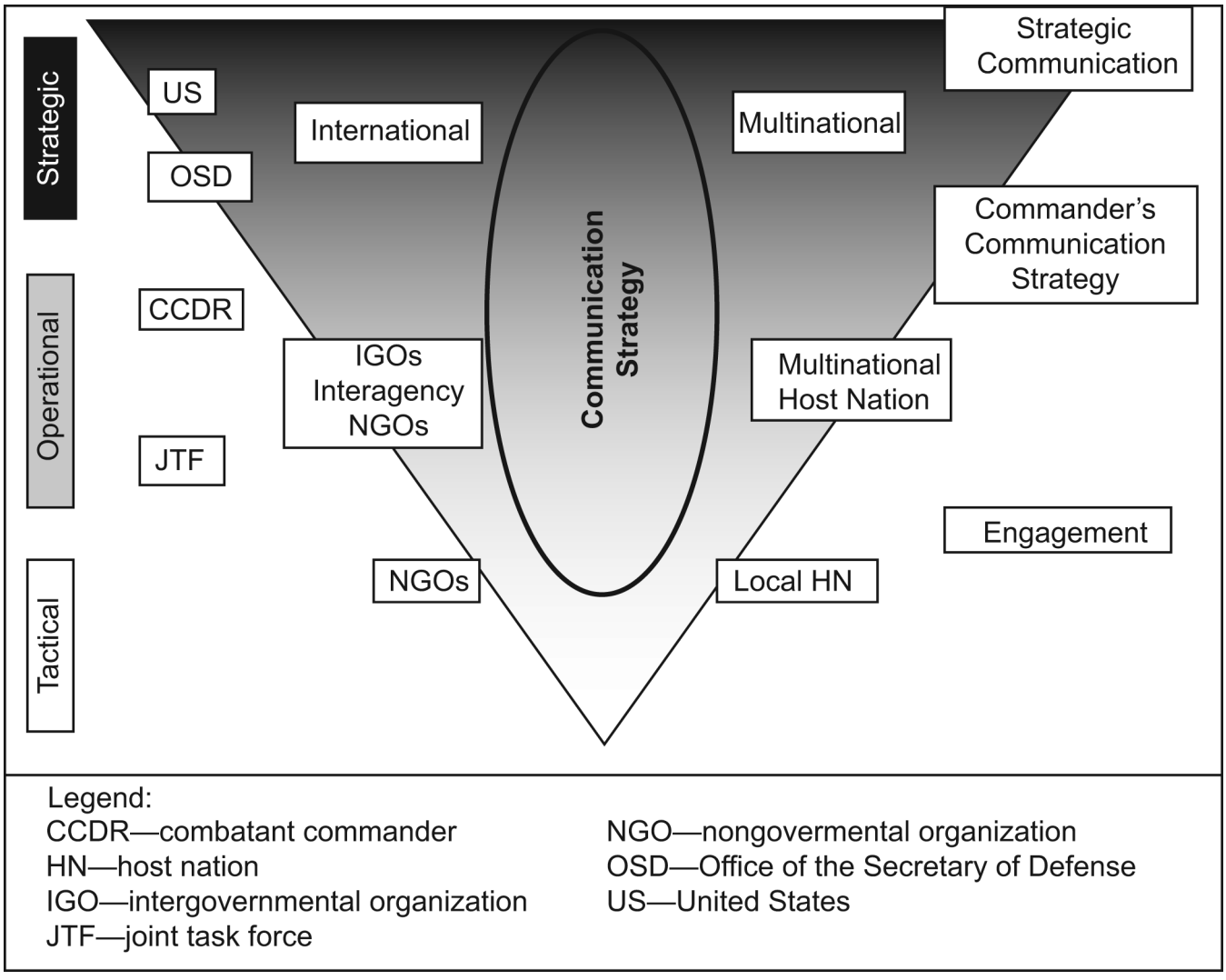

Figure 1. Integrated Communication Strategy

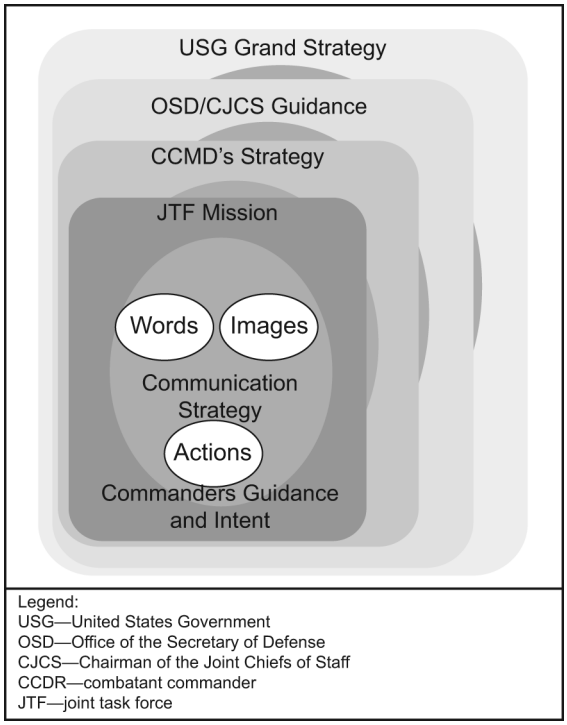

Figure 2. Nested Communication Strategy

During my current assignment as a joint staff observer-trainer for Strategic Communication, Information Operations, and Military Information Support Operations, I have seen combatant commands and joint task forces struggle to communicate effectively within the IE. A successful communication strategy leverages all means to support the commander's objectives of communicating within the IE by laying out the "ends" (i.e., those themes that support the overall strategy), the "ways" by which the commander desires to communicate within the IE, and the specific "means" (including empowerment, and in some cases, restrictions on subordinates). Incorporating well conceived themes as part of the strategy directly supports mission-type orders by providing the framework for empowered (and distributed) messaging by subordinates to dominate the IE. My observations indicate there are five key components, to successful communications within the IE.

The commander's communication strategy process aligns actions and words at the operational and tactical levels with USG and theater strategic-level strategic communication.

The first of these components is a commander driven communication strategy that is emphasized at the beginning of the process. The second component requires the strategy be nested with USG, multinational partners, and stakeholders' guidance and strategies. Coordination and synchronization at all levels is the third component and create proactive execution and avoid information fratricide. The fourth component is the development of an assessment process, evaluating measures of effectiveness (MOE) and measures of performance (MOP). The first four components facilitate the fifth, a responsive communication capability that is flexible and adjusts to events during operations and supports the achievement of the commander's objectives. Let us look at each component in depth.

- **Commander Driven.** This approach is most successful when the commander implements communication guidance early in the design and planning process, and continues to refine and assess communication guidance throughout mission execution.

- **Nested.** For communication to be effective, it must be consistent. Inconsistency in words, actions, and images opens an opportunity that adversaries exploit. Communication guidance must be nested down to the lowest possible tactical level. The nested plates in figure 2 represent the overall mission sets being performed by the entire USG. The commander's communication strategy must be nested across the mission sets. It is not a separate or parallel strategy, but an integral part of the overall plan.

- **Coordination and Synchronization.** The commander's communication strategy process aligns actions and words at the operational and tactical levels with USG and theater strategic-level strategic communication. In addition to synchronizing the communication activities within the planning process for DOD entities, it allows for the support of other USG organizations, coalition partners, and nongovernmental organizations. This process aids in recognizing and

capitalizing on opportunities for synergy between lethal and nonlethal activities, and across multiple organizations. (See figure 3).

• **Assessments.** A fundamental part of a successful commander's communication strategy process is the ability to assess the effectiveness of the strategy. Assessments are important in determining if communication activities are having the desired effect on a specific audience. Assessing effects can be extremely difficult in a nonlethal environment; but if no MOE or MOPs are tracked, a communication effort may have negative second- or third-order effects that outweigh its benefits.

• **Responsive.** A responsive communication capability is flexible and adjusts to events during operations and supports the achievement of the commander's objectives. Additionally, it allows communication capabilities to be directed by preempting misinformation efforts undertaken by adversaries.

This paper added context to DOD's definition of SC and discussed how successful commander's communication strategies are developed based on the guidance and intent of higher headquarters, and how staffs implement the strategy by synchronizing and deconflicting planning efforts. Understanding the impacts of an integrated communication strategy will help future commanders and staffs incorporate the five components for a successful commander's communication strategy. They are: commander driven, nested, coordinated and synchronized, measurable assessments, and a responsive communication effort that is flexible and adjustable during the operation. This creates a successful achievement of the commander's objectives at any level.

Assessing effects can be extremely difficult in a nonlethal environment...

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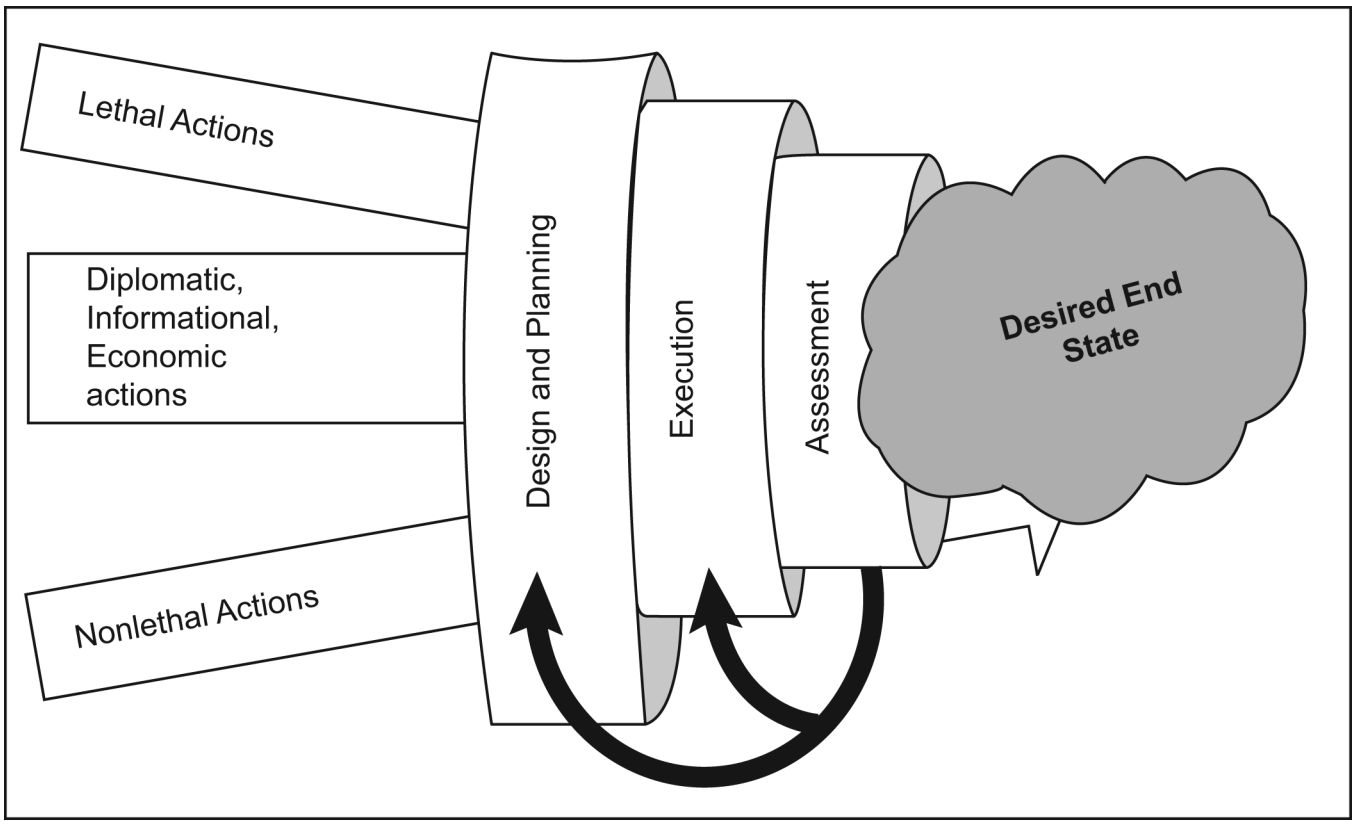

Figure 3. Coordination of Lethal and Nonlethal Actions

CURRENT ALSA MTTP PUBLICATIONS

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TITLE	DATE	PUB #	DESCRIPTION/STATUS
AIRSPACE CONTROL *Multi-Service Tactics, Techniques, and Procedures for Airspace Control* **Distribution Restricted**	22 MAY 09	FM 3-52.1 AFTTP 3-2.17	Description: This MTTP publication is a tactical-level document which synchronizes and integrates airspace C2 functions and serves as a single-source reference for planners and commanders at all levels. **Status: Revision**
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KILL BOX *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment* **Distribution Restricted**	16 Apr 14	ATP 3-09.34 MCRP 3-25H NTTP 3-09.2.1 AFTTP 3-2.59	Description: This MTTP publication outlines multi-Service kill box planning procedures, coordination requirements, employment methods, and C2 responsibilities. **Status: Current**
SCAR *Multi-Service Tactics, Techniques, and Procedures for Strike Coordination and Reconnaissance* **Distribution Restricted**	10 JAN 14 Change 1 incorporated 31 MAR 14	ATP 3-60.2 MCRP 3-23C NTTP 3-03.4.3 AFTTP 3-2.72	Description: This publication provides strike coordination and reconnaissance MTTP to the military Services for conducting air interdiction against targets of opportunity. **Status: Current**
SURVIVAL, EVASION, AND RECOVERY *Multi-Service Procedures for Survival, Evasion, and Recovery* **Distribution Restricted**	11 SEP 12	ATP 3-50.3 MCRP 3-02H NTTP 3-50.3 AFTTP 3-2.26	Description: This is a weather-proof, pocket-sized, quick reference guide of basic information to assist Service members in a survival situation regardless of geographic location. **Status: Current**
TAGS *Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System* **Distribution Restricted**	30 JUN 14	ATP 3-52.2 NTTP 3-56.2 AFTTP 3-2.17	Description: This publication promotes Service awareness regarding the role of airpower in support of the JFC's campaign plan, increases understanding of the air-ground system, and provides planning considerations for conducting air-ground ops. **Status: Current**
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CORDON AND SEARCH *Multi-Service Tactics, Techniques, and Procedures for Cordon and Search Operations* **Distribution Restricted**	10 MAY 13	ATP 3-06.20 MCRP 3-31.4B NTTP 3-05.8 AFTTP 3-2.62	Description: This is a comprehensive reference to assist ground commanders, subordinates, and aviation personnel in planning, training, and conducting tactical cordon and search operations. **Status: Current**
ENGAGEMENT TEAMS *Multi-Service Tactics, Techniques, and Procedures for for Conducting Engagements and Employing Engagement Teams* **Distribution Restricted**	10 MAY 13	ATP 3-07.40 MCRP 3-33.1H NTTP 3-57.5 AFTTP 3-2.84	Description: This multi-Service publication provides a framework for conducting engagements at the tactical level with the purpose of shaping and influencing operations to achieve a commander's objectives. **Status: Current**
EOD *Multi-Service Tactics, Techniques, and Procedures for Explosive Ordnance Disposal in a Joint Environment* **Distribution Restricted**	20 SEP 11	ATTP 4-32.16 MCRP 3-17.2C NTTP 3-02.5 AFTTP 3-2.32	Description: This publication identifies standard MTTP for planning, integrating, and executing EOD operations in a joint environment. **Status: Revision**
IMSO *Multi-Service Tactics, Techniques, and Procedures for Integrated Money Shaping Operations* **Distribution Restricted**	26 APR 13	ATP 3-07.20 MCRP 3-33.1G NTTP 3-57.4 AFTTP 3-2.80	Description: IMSO describes how to integrate monetary resources with various types of aid within unified action to shape and influence outcomes throughout the range of military operations. **Status: Current**
MILITARY DECEPTION *Multi-Service Tactics, Techniques, and Procedures for Military Deception* **Classified SECRET**	13 DEC 13	MCRP 3-40.4A NTTP 3-58.1 AFTTP 3-2.66	Description: This publication facilitates integrating, synchronizing, planning, and executing MILDEC operations. It is a one-stop reference for service MILDEC planners. **Status: Current**
MILITARY DIVING OPERATIONS (MDO) *Multi-Service Service Tactics, Techniques, and Procedures for Military Diving Operations* **Distribution Restricted**	12 JAN 11	ATTP 3-34.84 MCRP 3-35.9A NTTP 3-07.7 AFTTP 3-2.80 CG COMDTINST 3-07.7	Description: This publication is a single source, descriptive reference guide to ensure effective planning and integration of multi-Service diving operations. It provides combatant command, joint force, joint task force, and operational staffs with a comprehensive resource for planning military diving operations, including considerations for each Service's capabilities, limitations, and employment. **Status: Revision**
NLW *Multi-Service Service Tactics, Techniques, and Procedures for the Tactical Employment of Nonlethal Weapons* **Distribution Restricted**	24 OCT 07	FM 3-22.40 MCWP 3-15.8 NTTP 3-07.3.2 AFTTP 3-2.45	Description: This publication provides a single-source, consolidated reference on employing nonlethal weapons. Its intent is to make commanders and subordinates aware of using nonlethal weapons in a range of scenarios including security, stability, crowd control, determination of intent, and situations requiring the use of force just short of lethal. **Status: Revision**
PEACE OPS *Multi-Service Tactics, Techniques, and Procedures for Conducting Peace Operations* **Distribution Restriction**	1 Nov 14	ATP 3-07.31 MCWP 3-33.8 AFTTP 3-2.40	Description: This publication offers a basic understanding of joint and multinational PO, an overview of the nature and fundamentals of PO, and detailed discussion of selected military tasks associated with PO. **Status: Current**
TACTICAL CONVOY OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations* **Distribution Restricted**	18 APR 14	ATP 4-01.45 MCRP 4-11.3H NTTP 4-01.3 AFTTP 3-2.58	Description: This is a quick-reference guide for convoy commanders operating in support of units tasked with sustainment operations. It includes TTP for troop leading procedures, gun truck employment, IEDs, and battle drills. **Status: Current**
UXO *Multi-Service Tactics, Techniques, and Procedures for Unexploded Explosive Ordnance Operations* **Distribution Restricted**	20 SEP 11	ATTP 4-32.2 MCRP 3-17.2B NTTP 3-02.4.1 AFTTP 3-2.12	Description: This publication provides commanders and their units guidelines and strategies for operating with UXO threats while minimizing the impact of the threats on friendly operations. **Status: Revision**

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TITLE	DATE	PUB #	DESCRIPTION/STATUS
AOMSW *Multi-Service Tactics, Techniques, and Procedures for Air Operations in Maritime Surface Warfare* **Distribution Restricted**	15 JAN 14	MCRP 3-25J NTTP 3-20.8 AFTTP 3-2.74	Description: This publication consolidates Service doctrine, TTP, and lessons-learned from current operations and exercises to maximize the effectiveness of air attacks on enemy surface vessels. **Status: Assessment**
BIOMETRICS *Multi-Service Tactics, techniques, and Procedures for Tactical Employment of Biometrics in Support of Operations* **Approved for Public Release**	1 APR 14	ATP 2-22.85 MCRP 3-33.1J NTTP 3-07.16 AFTTP 3-2.85 CGTTP 3-93.6	Description: Fundamental TTP for biometrics collection planning, integration, and employment at the tactical level in support of operations is provided in this publication. **Status: Current**
BREVITY *Multi-Service Brevity Codes* **Distribution Restricted**	23 OCT 14	ATP 1-02.1 MCRP 3-25B NTTP 6-02.1 AFTTP 3-2.5	Description: This publication defines multi-Service brevity which standardizes air-to-air, air-to-surface, surface-to-air, and surface-to-surface brevity code words in multi-Service operations. **Status: Current**
COMCAM *Multi-Service Tactics, Techniques, and Procedures for Joint Combat Camera Operations* **Approved for Public Release**	19 APR 13	ATP 3-55.12 MCRP 3-33.7A NTTP 3-61.2 AFTTP 3-2.41	Description: This publication fills the combat camera doctrine void and assists JTF commanders in structuring and employing combat camera assets as effective operational planning tools. **Status: Current**
DEFENSE SUPPORT OF CIVIL AUTHORITIES (DSCA) *Multi-Service Tactics, Techniques, and Procedures for Civil Support Operations* **Distribution Restricted**	11 FEB 13	ATP3-28.1 MCWP 3-36.2 NTTP 3-57.2 AFTTP 3-2.67	Description: DSCA sets forth MTTP at the tactical level to assist the military planner, commander, and individual Service forces in the employment of military resources in response to domestic emergencies in accordance with US law. **Status: Revision**
EW REPROGRAMMING *Multi-Service Tactics, Techniques, and Procedures for the Reprogramming of Electronic Warfare and Target Sensing Systems* **Distribution Restricted**	17 JUN 14	ATTP 3-13.10 NTTP 3-51.2 AFTTP 3-2.7	Description: This publication describes MTTP for EW reprogramming; the EW reprogramming process, requirements, and procedures for coordinating reprogramming during joint and multi-Service operations, Services' reprogramming processes, organizational points of contact, and reprogramming databases and tools. **Status: Current**
JATC *Multi-Service Procedures for Joint Air Traffic Control* **Distribution Restricted**	14 FEB 14	ATP 3-52.3 MCRP 3-25A NTTP 3-56.3 AFTTP 3-2.23	Description: This is a single source, descriptive reference guide to ensure standard procedures, employment, and Service relationships are used during all phases of ATC operations. It also outlines how to synchronize and integrate JATC capabilities. **Status: Current**
TACTICAL CHAT *Multi-Service Tactics, Techniques, and Procedures for Internet Tactical Chat in Support of Operations* **Distribution Restricted**	24 JAN 14	ATP 6-02.73 MCRP 3-40.2B NTTP 6-02.8 AFTTP 3-2.77	Description: This publication provides commanders and their units guidelines to facilitate coordinating and integrating tactical chat when conducting multi-Service and joint force operations. **Status: Current**
TACTICAL RADIOS *Multi-Service Communications Procedures for Tactical Radios in a Joint Environment* **Approved for Public Release**	26 Nov 13	ATP 6-02.72 MCRP 3-40.3A NTTP 6-02.2 AFTTP 3-2.18	Description: This is a consolidated reference for TTP in employing, configuring, and creating radio nets for voice and data tactical radios. **Status: Current**
UHF SATCOM *Multi-Service Tactics, Techniques, and Procedures Package for Ultra High Frequency Military Satellite Communications* **Distribution Restricted**	9 AUG 13	ATP 6-02.90 MCRP 3-40.3G NTTP 6-02.9 AFTTP 3-2.53	Description: Operations at the JTF level have demonstrated difficulties in managing a limited number of UHF SATCOM frequencies. This publication documents TTP that will improve efficiency at the planner and user levels. **Status: Current**

Got a story? Want to tell it? Help us help you!

The Air Land Sea Application (ALSA) Center develops multi-Service tactics, techniques, and procedures (MTTP) with the goal of meeting the immediate needs of the warfighter. In addition to developing MTTP, ALSA provides the ALSB forum to facilitate tactically and operationally relevant information exchanges among warfighters of all Services.

There is no better resource for information than the people doing the jobs. Personal experiences, studies, and individual research lead to inspirational and educational articles. Therefore, we invite our readers to share their experiences and possibly have them published in an upcoming ALSB.

We want to take your expertise and lessons learned from recent operations or any other multi-Service or multinational missions in which you have been involved, and spread that knowledge to others. Get published by sharing your experiences and expertise.

The June 2015 ALSB topic is defense support of civil authorities and inter-agency support. This edition will focus on the issues of integrating military assets with civil authorities.

The Sep 2015 issue is an Open Warfighter Forum where warfighters will have an opportunity to discuss topics of their choosing. This is an excellent opportunity for you to share your insights, on topics that may not be covered in doctrine or address an operational gap that highlights emerging needs for supporting multi-Service publications.

Please keep submissions unclassified and in accordance with the instructions in the requirements box on this page.

Article Requirements

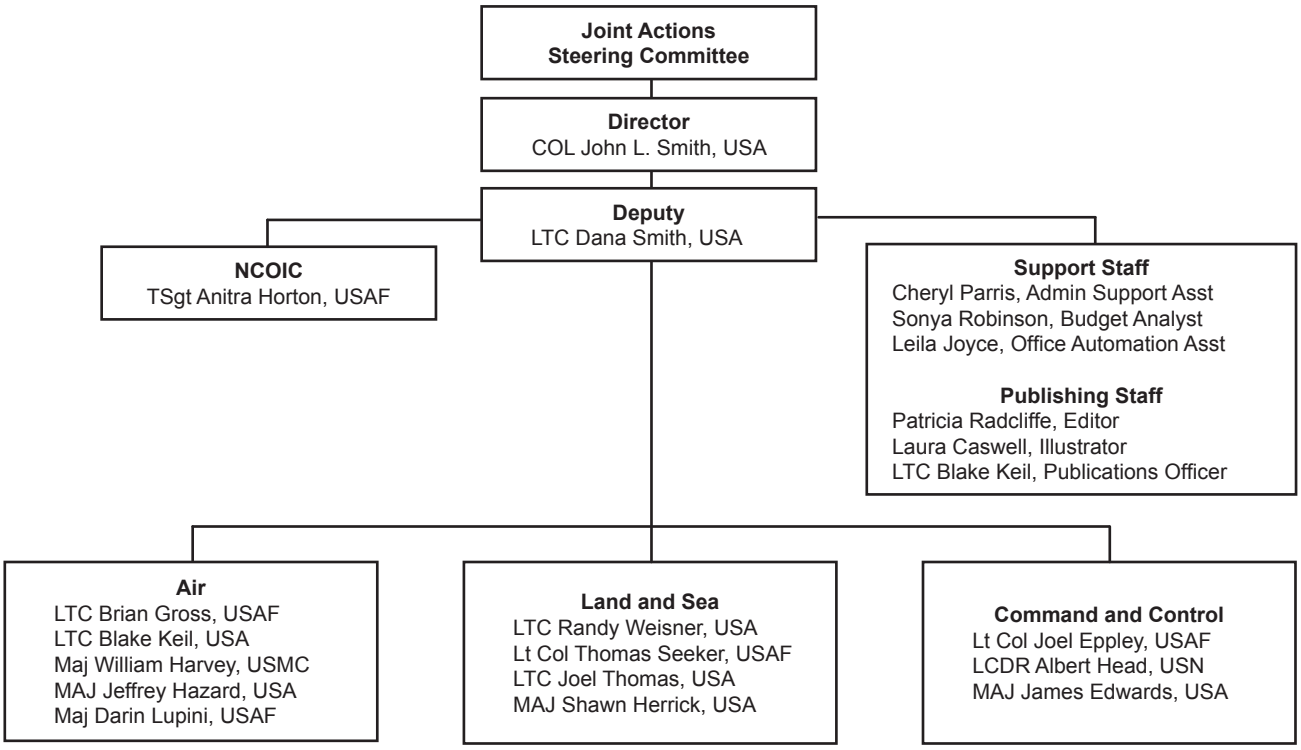
Submissions must:

- Unclassified
- Be 1,500 words or less
- Be publicly releasable
- Be double spaced
- Be in MS Word format
- Include the author's name, unit address, telephone numbers, and email address
- Include current, high-resolution, 300 dpi (minimum), original photographs and graphics. Public affairs offices can be good sources for photographs or graphic support.

Article and photo submission deadlines are below. Early submissions are highly encouraged and appreciated.

Topic	Deadline	Point of Contact
DSCA	1 Feb 2015	alsaC@us.af.mil (757) 225-0967
Open Warfighter Forum	1 May 2015	alsaA@us.af.mil (757) 225-0905

ALSA ORGANIZATION



ALSA JOINT WORKING GROUPS

Date	Publication	Location	Point of Contact
8-12 Dec 14	JSEAD	Joint Base Langley-Eustis	Air Branch alsaA@us.af.mil
16 Dec 14	JFIRE	DCO	Air Branch alsaA@us.af.mil
19-22 Jan 15	JFIRE	Joint Base Langley-Eustis	Air Branch alsaA@us.af.mil
26-30 Jan 15	JSEAD	TBD	Air Branch alsaA@us.af.mil
11 Feb 15	JFIRE	DCO	Air Branch alsaA@us.af.mil
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ALSA's mission is to rapidly and responsively develop multi-Service tactics, techniques and procedures, studies, and other like solutions across the entire military spectrum to meet the immediate needs of the warfighter.

ALSA is a joint organization governed by a Joint Actions Steering Committee chartered by a memorandum of agreement under the authority of the Commanders of the Army Training and Doctrine Command, USMC Combat Development Command, Navy Warfare Development Command, and Headquarters, Curtis E. LeMay Center for Doctrine Development and Education.

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