

Building a Technology Center for Iraqi Air Force Communications Training

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ABSTRACT

The US Air Force (USAF) Expeditionary Communications Squadron (ECS) is one of several combatant organizations responsible for providing strategic and tactical communication services to the US and Coalition Forces in theater. The ECS's communication capability is amongst the most technologically advanced in the world. In light of our technological prowess, here at the Kirkuk Regional Air Base (KRAB) in Iraq, the 506 ECS embraces additional challenges beyond the standard expeditionary communication mission. This paper discusses our experience building a technology transfer center for training the Iraqi Air Force (IqAF) communications squadron, our counterpart. This project further KRAB's mission to enable our Iraqi partners and it fits into the overall US mission of nation-building or stability operations of Operation Iraqi Freedom (OIF). We discuss our objective, methodology, experience and lessons learned. We hope that our experience at Kirkuk will translate into a best-practice approach that can potentially be beneficial to future stability and training operations.

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INTRODUCTION

Operation Iraqi Freedom, also referred to as the Second Persian Gulf War, is a military campaign which began on March 20, 2003 and is now executing a planned US withdrawal. The war commenced with the invasion of Iraq by a multinational force and was characterized by the rapid destruction of the ruling Ba'athist party regime. However, it has had a protracted period of rebuilding and social strife that has cost more US lives than the original assault (DoD, 2010). Similarly, the post-combat period has cost the Iraqis more lives (Bernham, *et al.*, 2006). At this stage, the US involvement is planned to be one of declining troop strength, and the mission is morphing from combat to advising and training Iraqi security forces to provide intelligence and surveillance. The mission was officially stated as being one to "...change from combat to supporting the Iraqi government and its Security Forces as they take the absolute lead in securing their country" (NY Times, 2009). The US and Iraqi governments have entered into a Status of Forces Agreement effective through January 1, 2012 (OSD, 2008), under which our work was undertaken.

The US Air Force expeditionary communications squadron (ECS) is one several combatant organizations responsible for providing strategic and tactical communication services to US and Coalition Forces in the Area of Responsibility (AOR). This paper will address experience with building a technology transfer center for training an Iraqi Air Force (IqAF) communications squadron.

Background of Communications Training in Iraq

Similar to previous wars, some of the most difficult training evolutions required from US forces on behalf of partner allies have been in the teaching of technical skills. One of the most technical disciplines to instruct is that of communications procedures. US Marines have been working in the area of battlefield communications with infantry troops (Galloway,

2010), and have reported uneven successes in those endeavors. They mixed classroom and field exercises, following realistic scenarios. Cultural differences, such as those noted in the CLAD Handbook, (Diaz-Rico & Weed, 2005) may have had a significant impact on the differing views on procedural precision, but good will and focused practice quickly ironed out those issues, at least, ostensibly, between the US and Iraqi forces. As an example, the Marines reported success in getting their Iraqi counterparts to use more consistent reporting formats to convey status information, even though that conformity was not part of their culture.

One of the Marine instructors reported, "The most difficult part in training the Iraqis on MEDEVAC [medical evacuation] procedures was correlating the classroom training to the actual hands-on exercise" (Galloway, 2010). The focus of the training reported on in this paper has a different set of goals, but many of the issues are common between the Marine's experience (Figure 1) and that found in the 506 ECS setting.



Figure 1. Iraqi Forces Practice Communications

(US Army photo by SPC Maurice A. Galloway)

This Marine administered training had an impact on the Iraqi civil government, as the country prepared for the March 7th elections. It was important that the Iraqi

Army (IA) was both effective and was perceived as being effective as an integral part of the new Iraq. The IA did play a significant role in ensuring the security of the polls and the elections did not result in civil collapse. More importantly, the training highlighted the IA's transition from a cooperating force to more of a primary military role in securing their country. This training centered on their new concentrated scope of responsibility.

Earlier work by the authors' group at the University of Southern California has discussed the ability of technology developed at the US Joint Forces Command to address some of the issues of uniformly training a geographically dispersed community of military personnel. (Davis and Davis, 2006). While this capability was not in place in Kirkuk, its use might warrant further research. Studies have shown that cultural and learning style differences are easier to identify and characterize than they are to genuinely overcome them in the classroom setting.

Such a computer-aided education capability might also ameliorate the difficulties in collaborative learning

(Dillenbourg, 1994). There was virtually no Iraqi Army during the post-war period. The steadily growing size of the Iraqi forces, set forth in **Table 1**, may further mandate an effort to utilize distance education and interactive collaborative learning via distributed high performance computing.

Table 1. Estimates of Iraqi Armed Forces

Era	1st Gulf War	2nd Gulf War	2010
IA	545,000	350,000	197,000
IqAF	15,000	9,500	1600
Navy	5,000	3,500	800
Total	565,000	363,000	201,410

Kirkuk is approximately 160 miles north of Baghdad (Figure 2) and has a large Kurd population. Kirkuk Regional Air Base, also known as Hurriya Air Base, is located in the northern province of Kirkuk in the foothills of Hamrim mountain range, which is part of the Zagros Mountains. The air base is defended and administered by combined forces of the United States and of Iraq.



Figure 2. Map Showing Relative Position of Kirkuk and KRAB

The 506 Air Expeditionary Group's (AEG) mission is to "secure the base...safe flight operations...enable our Iraqi partners." The 506 AEG consists of seven squadrons:

- Logistics
- Medical
- Communications
- Airfield Operations
- Services
- Security Forces
- Engineering

Each of the squadrons, in addition to their base support mission is charged with taking on the additional duty of enabling their Iraqi partners. Generally, that involves imparting sufficient skills and knowledge to their Iraqi counterparts to enable them to function effectively and autonomously as a military force. What follows is how the communications squadron stood up a communications training center with a well-defined curriculum that plays an important role in the overall mission to enable our Iraqi partners.

BACKGROUND

The Air Force Expeditionary Communications Squadron at the Kirkuk Regional Air Base has many unique challenges. Many of these challenges were particularly exacerbated by the combat environment in which we operated. In light of these challenges, the underlying key to a successful campaign in Iraq is built on General Petraeus's well-ingrained call to win the hearts and minds of the indigenous population (Robinson, 2008).

The 506 ECS's primary task is to provide strategic and tactical communications to the war fighters at Forward Operating Base (FOB) Warrior. On paper, our primary customers are Air Force units; in reality, our customers consisted mainly of US Army Units and other US Government tenant units at FOB Warrior. Over the years, in the spirit of joint war fighting, the squadron developed a strong relationship with the 72nd Expeditionary Signal Battalion C Company, the 392nd Expeditionary Signal Battalion E Detachment, and the 1st Armor Division 1st Brigade S6. As US Air Force and Army's missions evolved from base and regional security to enabling our partners, so did the circle of our communication partners. We began forging relationships and building partnerships with our Iraqi Air Force (IqAF) and Iraq Civil Aviation Authority (ICAA) counterparts on joint communications projects. The projects ranged from the design and implementation of a fiber optic infrastructure to building a Very Small Aperture Terminal (VSAT)

radar feed to consolidate the entire airspace for the country of Iraq.

We recognized that when US forces hand over control of FOB Warrior to the Iraqis, it will be vitally important that they are adequately trained and are prepared to take on base ownership. Establishing a technology training center with specific and tractable programs was a necessary prerequisite. In our case, we built the training program from the ground up.

The challenges involved in the building of such a program were many, but none of the challenges proved insurmountable. The key challenges were overcoming the cultural and language barrier between US and Iraqi forces, de-conflicting the classification levels of the various platforms on the US Air Force network, and finally, managing the compressed training schedule required due to rapid US personnel turnover.

Curriculum Development

Traditionally, curriculum development morphs in response to the demands and attitudes of the age (Bruner, 1960). Early definitions from educators followed the so-called *product approach* (Tyler, 1947). Rather than starting with the desired outcome, an approach from the infamous *Seventies* advocated an emphasis on the processes, rather than the product, hence the name *process approach* (Stenhouse, 1975). Being an Expeditionary Force and being faced with limited time horizons, the training we developed at Kirkuk had to be focused on the product that we desired and the results that the Iraqis needed. So this curriculum development effort may be thought to come closest to the *praxis approach* (Smith, 2000). But it was not based on any sophisticated understanding of the theory of curriculum development. It may actually have been a spontaneous and naive paradigmatic instantiation of something more like the *understanding by design* philosophy (Wiggins and McTighe, 2005). This definitely was a "backward design" activity.

After identifying the goals, we initially developed a formal training plan and insured that each of the lessons mapped to our functional units. The reason is to evenly distribute the workload across each of the five work centers. Table 2, which summarizes the training program curriculum, shows how the curriculum we developed matched some of our expeditionary communication responsibilities. This work center structure breakdown and the inclusive functions are universal throughout the Air Force. In other words, the training program as it is designed would be appropriate for any airman deployed to the AOR and the model is a

“plug and play” model that can fit into any FOB locations.

Table 2. Training program broken down by work center and training objective

Work Center	Training Area	Objective
Help Desk & TCF	Customer support and ticketing system	Tiered support and single focal point for tech solutions
Tech Control Facility	Networking	How to build an interconnect networks
Network Control Center	System Administration	Centralized ID management; server management and configuration
Infrastructure	Copper and fiber optic cable plant	Architect and implement base inside and outside cable plant
Ground Radio	LMRs & other hand held radios	Radio operation and radio communication etiquette

As the training progressed, we observed that the curriculum mapped nicely to our work centers and the workload distribution was fair. However, we quickly realized it did not map one-to-one to the IqAF work centers. More importantly, some of the concepts being taught had no relevancy to their organization structure. Consequently, we refined the curriculum by tailoring the training program to meet the Iraqis’ immediate needs. Feedback from the IqAF students and leadership guided our efforts.

We made some general observations:

- Hands-on training is more productive than abstract theory course work
- Design and implementation together yield the highest level of learning satisfaction
- A customer support model is heavily impacted by culture and corporate ways of doing business

Non-technical Challenges

We recognized from the beginning that in order to build a strong training program, we must first establish trust and build interpersonal relationships between the IqAF and the US airmen. This sense of trust is a bi-directional cultural awareness exercise. For example, the IqAF challenges us to a weekly soccer match. The teams are often, but not always structured as US versus Iraqi; however, sometimes we have games where Iraqis and Americans play on the same team. Other relationship building events included social settings

such as BBQ and change of command ceremonies. Once the groundwork for a relationship has been established, the classroom instruction follows.

Our observations and practice are in line with McFate’s assertion that cultural awareness matters operationally and strategically (McFate, 2005). Our approach is in accord with direction from General Petraeus’ direction to “Build relationships. Relationships are a critical component of counterinsurgency operations. Together with our Iraqi counterparts, strive to establish productive links with local leaders, tribal sheikhs, governmental officials, religious leaders, and interagency partners” (Petraeus, 2008).

The short nature of AEF rotation cycle challenged our ability to build enduring relationship. Relationships require significant development time and by the time we were ready to begin instruction, the next group of Airmen would cycle through. The process seemed to start all over again for the next group. While we have not found an optimal solution to mitigate this hurdle, we have built the IqAF training program into our continuity folder. Since the training we provide mirrors the training program our airmen receive throughout their military career, we have observed that personnel from the new AEF cycle can pick up where the last ones left off.

Training Environment

Perhaps the most difficult of all hurdles to overcome was safe guarding sensitive documents and technology while concurrently providing a meaningful high-quality training environment. To mitigate any possible concerns, we established non-negotiable baseline guidance for the technology center:

- No live AF system can be used for training
- No Foreign Nationals (FN) access to the inter-transfer nodes (ITN), Tech Control Facilities (TCF) or Network Control Center (NCC)
- Base network configuration and physical topology are not part of any case studies
- Classified systems are completely off limits

After having established the above parameters, we built training labs consisting of:

- A virtual network lab using 4 CISCO routers and 4 laptops serving both as configuration terminals and connection points (Figure 3)
- A telephone interconnection point mockup board (Figure 4)

- A test channel on our Land Mobile Radio (LMR) network
- A computer cloning lab that employs desktop and laptop “ghosting” technology

Although the above restrictions initially appeared to be harmful to the trust-building aspects of our relationship, the Iraqis are accustomed to our rigorous adherence to network security measures in our daily activities. As a result, the established guidance was a non-issue throughout the training period.



Figure 3. We staged a CISCO lab; shown here A1C Chris Redman and A1C Andre Taylor start the class with basic networking theory as the Iraqi students prepare for hands-on laboratory exercises.

Since our environment was expeditionary, most of the materials used to build our training center were makeshift and largely made out of spare parts, *e.g.* the telephone punchboard trainer shown in the picture below (Figure 4).



Figure 4. We built a mockup telephone punch board for hands-on infrastructure training.

Other Challenges of Our Training Program

There were aspects of our program that did not work as well as we would have liked. These included differing views on culturally defined priorities and abstract concepts that lack resources for hands-on exercise.

We attributed some of the reasons to concepts that are highly abstract and did not map to the Iraqi's corporate culture. For example, the notion of tiered support structures did not resonate with our Iraqi counterparts because their view of customer service is closely tied to familiarity and established relationships. Priority is determined by “who” is requesting assistance and not on “what” is being requested. Another point, we centralized a customer support center by having a communication focal point call-center, where all communications service requests were channeled and routed accordingly – this was designed to inhibit customers from contacting the shops directly. While the benefits to such a model are well documented (NAO, 2007), many in the IqAF see this as less efficient due to increased overhead.

Another abstract component of the training program was the server management. We did not have the resources to prepare a full up Exchange, Active Directory, and Fileserver stack. We developed our training program mostly based on PowerPoint slides; again this is abstract and has little hands on value. Furthermore, the use of a domain controller to tier access level and centralize credential management is orthogonal to the IqAF's computer setup, where each workstation is configured with a single login account and blessed with full administration rights. In light of the above, we feel that as the technology-training center evolves, this topic will become more relevant as their user base grows.

OUR SUCCESS STORY: HYBRID BETWEEN THEORY AND HANDS-ON

As we put the above training program into action, we collected metrics on the effectiveness of our work by focusing on three projects.

Fiber and Copper Connectivity Project

By learning about the various copper and fiber optic technologies, specifically how to prepare a cable project, terminate the ends, and run the cables, the IqAF members were able to design and complete several copper and fiber projects alongside US Airmen. By empowering the Iraqi students with design and planning inputs, we've explored yet another means of building trust. The completion of a fiber run between the Iraqi flight line and the Iraqi Air Operation Center highlights a momentous accomplishment. Together, both sides ran over 2000 feet of fiber, rewired over one mile of copper and terminated over 200 end points (Figure 5). This project was a major success because it enabled the Iraqis to communicate between their training wing on the flight line and the operation center

over the Iraqi Defense Network (IDN) as opposed to relying on commercial cell phones.



Figure 5. IqAF 1LT Majed Alla working with US Airmen to prepare copper interconnection points.

Desktop Replication Workbench

Desktop computer preparation is highly repetitive and time consuming. To streamline the process, we offered a class on ghosting hard drives for large-scale



replication. Of all of our classes, this was perhaps the most rewarding lesson because we were able to empower the students with real time saving and quality control improvements. Previous to the training, preparation of a computer workstation would take over four hours and this did not include getting the latest patch and software updates. After the mass replication training, the total time was reduced to about 30 minutes per machine.

Virtual Network Path Connectivity

The Iraqi Civil Aviation Authority requested assistance finding and implementing a solution to feed radar data from Kirkuk to Baghdad. Once completed, this radar feed would provide an air picture of all of northern Iraq, enabling the Iraqi government to control all civil and military aircraft from one centralized facility, the Baghdad Air Control Center (BACC). Using our networking expertise we advised the Iraqis on building a virtual tunnel between the Kirkuk and Baghdad. Our team worked side-by-side with the Iraqis (Figure 6) to correctly configure and validate the connections between Kirkuk and Baghdad. The end result was a resounding success when the air space picture was correctly fed into the BACC.



Figure 6. SSgt Garcia trains the ICAA (left) on how to debug a CISCO 2811 router while checking for a network path between the Kirkuk DASR-11 radar feed and the BACC (right).

Takeaway Lessons Learned

Our experience with the training center and curriculum has reaffirmed that a combination of theory and hands-on training is the best approach to resolving multinational training challenges. We also emphasize the importance of reinforcing classroom instructions with real-world projects to demonstrate how the skills and knowledge students learn in the classroom can benefit their daily operations. More importantly, they demonstrate the value of the learning experience as an investment to improve job performance and increase pride of process ownership. Finally, the most important of all of the ingredients for a successful technology program is relationship building. Many of the trainers have established long-term friendships with the students.



Figure 7. Major John Tran presented LTC Mohammad Ali a soccer ball, symbolizing their cooperation and friendship

Cultural sensitivity and understanding is a must for combined operations. We made a committed effort to effectively cultivate good will amongst our Iraqi colleagues in many ways, including the support of local youth activities, such as soccer, and the presentation of memento items to promote the bonds of comradeship. In Figure 7, above, the author is shown with one of his IqAF colleagues to whom he has just given a baseball cap from the University of Southern California. Such gestures, while seemingly minor, helped create the team spirit necessary for the effective transfer of technical skills and knowledge. Moreover, they promote openness to issues that

potentially could be disruptive, *e.g.* the different views of service center organization, but could be easily resolved when the parties were close enough to freely comment on differing views without fear of fracturing group cohesiveness.

Curriculum development has many dimensions that need to be considered. Primary amongst these is the establishment of valid goals and objectives. The needs and capability of the trainees and their cultural predilections are another factor, one that may be unique to expeditionary force trainers, but one that has been observed throughout history (Boot, 2003). A third lesson learned was that the curriculum needs to take heed of the rotational schedule for the trainers and the need to provide guidance, assistance and time for incoming personnel to adequately assimilate the approaches, skills and relationships that were developed by the personnel who are rotating back to the United States. Lastly, it seems apparent that the curriculum should be designed with an eye toward the eventual need for even the training function to be assumed by the host country's best and brightest. Selecting these trainers for the future, cultivating their didactic talents and enabling their growth will pay large dividends for a continuing mutually beneficial relationship between the host country, Iraq in this case, and the United States in the years to come.

CONCLUSIONS

We were able to effectively build a technology transfer center for training an Iraqi Air Force communications squadron. This project was an important part of our mission and it will enable our Iraqi partners to excel at providing communications support to the air base near Kirkuk. It demonstrably fit well into the overall US mission of nation-building or stability ops of Operation Iraqi Freedom. We were able to meet our objective, refine our methodology, benefit from our experience and convey our lessons learned to the Air Force for future use in similar situations. Commands faced with similar objectives in the future would be well-advised to do a brief study of curriculum development as an educational discipline before finalizing their own program plan. We continue to press for the adoption of our experience at Kirkuk into a best-

practice approach that will prove to be beneficial to future stability and training operations.

Future Work

As part of transitioning base operations over to the Iraqis, we extend the scope of our training program by adapting the above methodology to focus on the IqAF airfield communications systems. We are developing a comprehensive curriculum that includes weather systems, Thales Instrument Landing System (ILS), and other air traffic control radar systems. This effort embodies our continuing mission to meet the president's vision of future self-reliance for Iraq.

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