Magicians in Desert Shield/Desert Storm

by Patricia Harden Metzger and Earl S. Takeguchi

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Spectrum management in peacetime is one thing; in wartime, quite another. Electronic battlefield compatibility in Saudi Arabia was confronted with a myriad of frequency management problems and challenges.

The enlisted soldiers who meet these challenges for the Army are called Frequency Managers with the additional Skill Identifier of D9. The word "magicians" aptly describes those top-notch Army soldiers who served as Army Force frequency managers during Operation Desert Shield/Desert Storm.

These Army communicators revealed their remarkable skills and innovative techniques combined with technical expertise and quick wit (tricks if you will) during the planning, deployment, and operational phases of the war in the desert to support radio and satellite frequency requirements of the maneuver, firepower, and intelligence forces.

Electromagnetic compatibility is something which everyone assumes simply happens automatically. Wrong. Frequency managers make it happen through quick wit, technical knowledge and engineering skills.

Several of these top frequency managers briefed their experiences at the recent Army Spectrum Management Conference in Fort Gordon, Georgia, and later talked freely about wrestling with frequency management problems. Their frank responses suggest positive steps for improving spectrum management, not only for the Army at every echelon but also for all the Services and for our allies.

SFC RONALD G. BLACKMORE
XVIII AIRBORNE CORPS

Q: What was your major concern upon arrival in Saudi Arabia?

A: As I told Mr. Takeguchi [HQDA Spectrum Management Office], I needed help. I needed to know where to send my frequency requests--CINCLANT, ARCENT, or CENTCOM, and how to get timely responses. What I also needed was a joint CEOI. The staff at CINC couldn't understand why I needed so many frequency assignments and consequently

only provided a small fraction of what the corps required. My request was too much to handle. Since all Services' frequency requests and assignments were handled at the CINC level, it was difficult trying to get CINC to understand the Army Force structure and why we needed so many frequencies. Finally, I went directly to the Department of the Army for frequency assignment assistance.

Q: So how did you get assignments to meet the immediate radio frequency requirements?
A: Maneuver commanders don't like to be restricted by bureaucracy, much less held up, by not having a frequency assignment for command and control radio nets. I kept two frequency assignment records--those authorized by the CINC and those additional frequencies that were being used by the corps to satisfy and maintain our operational requirements for command and control communications. Picking and using random unauthorized frequencies, that's what they call bootlegging. We were not bootlegging by definition; it was controlled. We were lucky. Next time if we run into a more sophisticated enemy, we may not be so successful.

SFC PHILLIP NELSON
5TH SIGNAL COMMAND, EUROPE

Q: What was your role in the Operation Desert Shield Desert Storm?
A: I was a member of the special DA spectrum management team sent to assist ARCENT G-6 [Army Central Command] during the build-up of US forces in Saudi Arabia. Numerous incidents of interference and the rapid buildup caused various procedural problems that increased in complexity as more and more frequency dependent equipment was deployed and operated in the theater.

Q: Why was it so difficult to communicate and to coordinate initial operations?
A: Part of the problem was not fully understanding how everyone fit into a multinational, all Services operation. In the heat of deployment and initial operations, there was a lot of competition between the Services for frequency assignments and use. Each Service was trying to secure frequencies to meet its battlefield needs, unaware or not understanding the importance or priority of the communications mission and the frequency requirements of the other Services. There was a total lack of coordination, cooperation, and communication from the CINC level all the way down to the lowest Army-fighting echelon. Without the management and procedural structure, increased interference incidents and degraded communications inevitably are the results.

Q:What can be done to improve spectrum management?
A: First, we need to improve frequency management at every echelon from the top down. Second, we really need to develop an automated record keeping system. During the war, a lot of the frequency assignments were duplicated, and a lot of them could have been reused. Every unit frequency manager in the field should have a sophisticated automated system to keep track of assigned frequencies. The automated system software program should be very easy to understand and use. The system should have software programs to validate the frequency request, eliminate the duplication of frequency assignments, and provide the frequency manager with information so he can determine what frequencies can be shared or reassigned.

MSG CECIL G. MCFIE
11TH SIGNAL BRIGADE, FORT HUACHUCA, AZ

Q: Why were you one of the first frequency managers sent to Saudi Arabia?
A: There were two reasons. I had theater experience and automation experience. In less than 15 months after graduating from the frequency management course at Kessler AFB, I had to work in the theater environment. I was the only frequency manager in the 32d Air Defense Command at Darmstadt, Germany. I'll never forget sitting across from a Navy admiral and an Army general in Germany, negotiating for frequencies. The 32d Air Defense had

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never had a frequency manager before, so they were getting me out of bed every night for two months to answer their questions about frequency problems. Until I helped them automate their system, I couldn't get any sleep. My experience in Germany as a frequency manager proved invaluable when the war in Saudi broke loose.

Q:What did you encounter when you arrived in Saudi Arabia?
A: In less than 45 days, I had to take the US and multinational forces' requirements and the Saudi's requirements and come up with a frequency plan everybody could agree upon.

People arrived in Saudi Arabia with minimal training in automation or knowledge of automated spectrum management tools--specifically those from the frequency management training schools at Kessler and Ft. Gordon. None of them was familiar with AFES. No one had really coordinated with other governments before as I had in Germany. Plus, no one in Saudi Arabia was trained in frequency management.

The Saudis don't know the treaties or the laws. All they know is that the spectrum is a resource to be used by each country as it chooses. Besides that, we were competing for frequencies used by everyone, the public, the airlines, as well as the military. Even the oil pipe lines in Saudi are controlled by frequency-dependent equipment."

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Q: How did you get experience using automated frequency tools, such as the Army Frequency Engineering System (AFES)?
A: I was at the Signal Center at Fort Gordon when LTC Takeguchi, then MAJ, and SFC Porter demonstrated AFES. When I saw that automated spectrum management tools were available, I learned everything I could about them on my own.

Q:What impact did AFES have on Desert Storm/Desert Shield?
A: It saved the day. At first I had to pick frequencies, using a pencil and a calculator to determine what frequencies could be used at a nodal center with co-sited radios. It would take me anywhere from 10 to 30 hours to pick 50 frequencies. Using AFES, I could have the job done in less than two hours."

Q: As you see it, what is the primary role of the frequency manager?
A: Finding a good frequency--that's what drives a frequency manager. What we do daily, that's not training--its real. People's lives are at stake. Everything we do could affect somebody else somewhere. We have to determine the interference factors and assign frequencies that don't interfere.

SGT MARK RUSSELL, 82D AIRBORNE DIVISION, FT. BRAGG

Q:What was your mission in Saudi Arabia?
A: I had to coordinate our unit's frequency requirements with other Army ground forces. When I departed for Saudi Arabia, I left with one shoulder bag full of messages. While on a flight layover, I contacted Rota, Spain, and found out all the frequencies available in our AO (Area of Operation). Enroute, I had to do something because I had been getting calls from our guys already in our AO through the satellite system, saying, "Hey, we don't know what's going on with our communications." Once I landed, I started making frequency allotments. When I sent messages to CENTCOM that we needed more numbers (frequencies), I kept getting messages back indicating that CENTCOM was having difficulty meeting our frequency requests.

Q: What other kinds of communications problems did you encounter?
A: Commanders couldn't understand why they couldn't talk to their units. I'd be getting major jamming reports almost daily. It took almost a month to get the commanders to understand that the 82d had to share frequencies.

Q: Was there a CEOI in place for the Operation?
A: Not really. We literally had to put our CEOIs together ourselves. We changed frequency assignments to meet our most critical need.

Q: So frequency assignments were made arbitrarily?
A: Basically, yes, but I controlled it. It had to be done before the troops moved, so I'd get a message ready to send out, stating that on this day, you won't be on this frequency; you will be on this other one. The cooperation between Army units was great. We got over there with nothing. When you hit the ground running, you've still got to talk. When they're under a lot of pressure, the troop unit commanders don't want to hear any excuses. I heard of lot of them say, "Give me a number and we will make it happen."

MR. WILLIAM 'JAKE' WOOLEY
5TH SIGNAL COMMAND, EUROPE
Q: What role did you play in the war in Saudi Arabia?
A: I am a civilian electronics engineer and frequency manager at 5th Signal Command, Worms, Germany. Because of my theater level experience with automated frequency management systems, I was selected as a member of the DA crisis action team deployed in Saudi Arabia.

Q: In your opinion, what can be done to improve spectrum management so in the event of war, everyone is "fit to fight"?
A: We need better frequency planning and coordination procedures. I doubt seriously if any frequency manager knows his unit's total go-to-war frequency requirements. No fault of their own, frequency managers are required to manage only a small portion of their actual requirements during training operations. Additionally, tactical frequency coordination procedures within the U.S. Army and at the joint command level are completely inadequate and are unable to support the continuous maneuvering of radio frequency (RF) dependent equipment on the battlefield. We need to decentralize frequency management responsibilities to the lowest possible echelons thereby improving responsiveness to the battlefield commanders. If we don't learn to do that better--and quickly--we will have chaos, and that means that the soldiers on the battlefield will resort to whatever it takes to find the necessary frequencies to do the job, regardless of the consequences to other friendly units.

Q: Could you explain what you mean by chaos?
A: Peacetime procedures have proved inadequate for wartime operations. Whenever units are not provided sufficient frequency resources, they are left with no recourse but to bootleg in order to accomplish the mission. They will make every attempt to coordinate between known units in the same geographic area, but this process is extremely time consuming and becomes a discarded luxury during the heat of battle. The result is frequency fratricide.

Q:What would help improve the frequency assignment process?
A: The Army desperately needs an automated system which would integrate several critical processes, such as planning initial frequency requirements, coordination of frequency resources to support the mission, EMC engineering and interference resolution, assignment record keeping, and data distribution between units. In Europe, we have been participating as an R&D testbed for evolving automated battlefield spectrum management systems. There were only a few similar prototype systems deployed to Saudi Arabia. We took one of our AFES computer systems with us and gave it to the corps Signal brigade. We also assisted the corps in procuring personal computers and communication engineering software for the Signal units at corps and division echelons. Frequency management and communications engineering are mutually dependent processes. Frequency management problems are greatly minimized when we smartly engineer tactical communication systems.

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But providing automated tools is not enough. We need to improve how frequency assignment information is distributed between units on the battlefield and between the various command echelons. In a hostile EMC environment such as Desert Storm, the forces are not static, and frequency assignments must be continually re-engineered. The problem was quite obvious during Operation Desert Storm: the

demand for frequencies far exceeded the supply. The ability to find a compatible frequency is severely diminished when the frequency spectrum is distributed to the service components in small discrete allotments. This will remain a necessary evil until we develop the frequency assignment tools which permit us to engineer compatible assignments for any RF emitters which compete for the same spectrum. If such a capability existed, and we were able to expediently distribute frequency assignment changes around the battlefield, then all service components could compatibly share and reuse the entire RF spectrum. The key to making this concept work is data distribution.

Q: What about inter-Service rivalries and the need for communication between the echelons?

A: Personality and inter-Service conflicts were evident. I believe such incidents were a direct result of poor training and inadequate coordination procedures. The demand for frequencies far exceeded any situation CENTCOM had ever confronted during training exercises. Without any previous experience in large theater operations, the joint frequency management staff began questioning each frequency request. Frequency coordination became bottlenecked, Army units were denied their required frequency resources, and chaos resulted.

Q: What you are saying is that Army frequency managers need more realistic training? What do you mean by "realistic" and how can that kind of training be accomplished?

A: I believe strongly in the adage: 'Train as you would fight.' The ability to do something well requires practice. Our training does not realistically practice battlefield frequency spectrum management. We need to integrate realistic communication planning and frequency management scenarios in our battlefield simulation systems. Within the last ten years we have seen a significant proliferation of RF dependent equipment on the battlefield. In addition to communication systems, these include weapons systems, navigational systems, intelligence systems, and electronic warfare systems. If we wait until an actual war to figure out how we will manage the spectrum to support these systems, then we have planned to fail. Currently, we are only working about 15% of the frequency demand during exercises. What happens when the other 85% is deployed?

Part of the problem is inadequate joint frequency management training. Also, there is not much doctrine on the subject, much less on procedures for performing frequency management functions.

Q: What about enrolling more Army personnel in the frequency management schools at Kessler or Fort Gordon?

A: Obviously, we needed more trained frequency managers during Operation Desert Shield/Desert Storm, but the schools cannot be expected to provide all the training necessary to make expert frequency managers. On-the-job training is necessary, too. Our only real recourse is to go back to the premise that we need to train more realistically.

From the interviews, one becomes keenly aware of how awesome a task frequency management was during Operation Desert Shield/Desert Storm, a task that would try even the greatest magician. The Army frequency managers in Saudi clearly deserve recognition for their perseverance and their diligence in the Operation.

The first annual Army Spectrum Management Conference was a positive step toward becoming aware, informed, and willing to communicate in order to improve Army spectrum management at all levels. The Army and the spectrum management community continue working to resolve frequency management issues and to address the many concerns raised during Operation Desert Shield/Desert Storm. Moreover, the Army spectrum management community strives to instill an understanding within the Army of the importance of having a well-trained frequency manager at each unit and installation. Further, Army spectrum management community leaders are actively investigating ways to realistically train Army frequency managers to meet future challenges to the Army's command, control, and communications mission.

Before he retired from active duty as an LTC, Mr. Takeguchi was the Deputy Army Spectrum Manager, Office of the Director of Information Systems Command, Control, Communications and Computers, Spectrum Management Office. In September 1990, he was tasked with organizing and leading a special team to resolve, develop and implement a frequency management system to support Army Central command and Central command for Desert shield/Desert Storm. A graduate of CGSC, he has an M.S. in Human Resources Management and Development.

Ms. Metzger is a technical editor at ITT research Institute in Annapolis, MD. She is also an English instructor and free lance writer. She has B.A. in journalism and humanities from the University of Maryland.