

AIR WAR COLLEGE

AIR UNIVERSITY

IMPROVING PROFESSIONAL DEVELOPMENT

FOR

USAF ELECTRONIC WARFARE OFFICERS

by

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Biography

Colonel Gregory M. Patschke is a US Air Force Electronic Warfare Officer assigned to the Air War College, Air University, Maxwell AFB, AL. He graduated from Pennsylvania State University in 1990 with a Bachelor of Science degree in Civil Engineering, Central Michigan University in 1997 with a Master of Science in Administration, and the Naval War College in 2004 with a Master of Arts in National Security and Strategic Studies. He earned his navigator wings in 1991 and has over 1,900 flying hours in the B-52G and B-52H. Colonel Patschke served at USSTRATCOM, Eighth Air Force, Air Staff, and is a graduated squadron commander.



Abstract

As technology advances and the electromagnetic spectrum continues to become more congested and contested, employment of electronic warfare (EW) will become increasingly difficult. EW now crosses multiple domains and mission areas creating new challenges. EW Officers (EWO) are currently not trained to overcome these challenges and several organizations and academics have identified it as a serious deficiency. Without continuing education and career development opportunities, EWOs may not have the necessary skill sets needed to effectively shape EW strategy, policy, operations, and planning.

Professional development comprises both continuing education and career development. In the US Air Force, the acquisition, space, and cyberspace communities have professional development programs already in place. For the continuing education half of professional development, the Air Force EW community should use the space program as a model to build a continuing education program from existing courses being taught by the 479th Operations Support Squadron and the Joint EW Center. This should provide a solid understanding of how to properly employ EW in today's complex environment.

For the career development half of professional development, EWOs need opportunities to acquire the broader leadership and strategic qualifications necessary to progress through their careers and be competitive for positions of significant influence within the Air Force. Career development would be improved by EWO presence on Development Teams and having an EW Functional Manager on the Air Staff. These recommendations will help develop EWOs into subject matter experts, warriors, leaders, advocates, and visionaries of tomorrow.

Introduction

Electronic Warfare (EW) is currently evolving at a rapid pace and has emerged as one of the most “in demand” capabilities the United States Air Force (USAF) provides the Joint Forces. EW facilitates freedom of operation in the land, sea, air, and space domains and ensures our ability to detect, degrade, deceive, destroy, and shape adversaries’ use of the electromagnetic spectrum (EMS).¹ This demand is driven by the exponential growth of wireless technology and increasing capability and availability of commercial-off-the-shelf (COTS) technology that continuously improves the sophistication of both symmetric and asymmetric warfare threats. Unfortunately, at a time when the strategic environment is becoming more complex, actions to prepare Air Force EW Officers (EWO) to meet these challenges remain static.

Today, most EWOs have limited opportunities to expand their EW knowledge or broaden their professional and leadership skills. Over the past several years, there have been studies and discussions on addressing EW capability gaps, yet, unlike the acquisition, space, and cyberspace communities, an official EWO professional development plan still does not exist. Today’s evolving, complex environment combined with a lack of continuing education opportunities and EWO career development challenges will together result in officers being deficient in the necessary skill sets needed to effectively shape EW strategy, policy, operations, and planning at the Major Command (MAJCOM) level and beyond, and in the joint and multinational environments.

Scoping the Problem

In academic circles, professional development is associated with attaining knowledge, skills, and abilities for both personal development and career advancement.² One can improve

these three attributes through education and training opportunities in the classroom, through on-the-job training, and through participation in external organizations with expanded responsibilities. The military does not have a formal definition of professional development. Most Air Force functional communities simply use the term to mean education and training. What has generally been neglected is the career development piece, now somewhat being addressed by USAF Developmental Teams (DT) hosted at the Air Force Personnel Center (AFPC). For the purposes of this paper, the term “professional development” includes career development as well as education and training.

In 2004, the USAF combined navigator, weapons system operator, and EWO training to form combat system officer (CSO) training. The Air Force explained this change as a necessary evolution to provide broader capabilities in the face of increasingly complicated missions.³ The *Journal of Electronic Defense* recently published an article which argued that EW has atrophied in the Air Force due to traditional EWO training being replaced by CSO training.⁴ Since the first CSO class only graduated in 2011, there is little data to evaluate this claim. MAJCOM training units need to assess the skill sets of the CSOs they receive and provide feedback to AFPC to correct training deficiencies. This paper will assume new CSOs are graduating with the required skill sets to meet aircraft-specific basic qualification standards. Also, to avoid confusion, CSOs who conduct EW will be considered EWOs in this paper.

The intent of this paper is to ensure USAF EWOs are adequately trained to meet today’s challenges and properly prepared to advocate EW issues when in a position of influence. The target population for the recommended professional development reforms is O-3 to O-5; this is not a guide to develop general officers. The scope only includes USAF EWOs since some of the processes discussed are Air Force specific.

Strategic Environment

It is important to begin with a discussion of the strategic environment, since this is what drives the requirement for improved and continuing EWO education and training. The global environment is characterized by uncertainty, complexity, and continual change. Technical improvements in electronic equipment are changing the landscape within which military forces must operate. In the past, EWOs were primarily concerned with defeating an enemy's Integrated Air Defense System (IADS). Today, the explosive growth of digital wireless and COTS technology increases and accelerates the means by which potential adversaries threaten US interests at home and abroad. This increasing availability of sophisticated equipment that can be used for legitimate civilian purposes as well as be weaponized for the military guarantees that the EMS will become only more contested and congested in the future.⁵

The recognized need for military forces to have unimpeded access to and use of the EMS creates opportunities and vulnerabilities for EW in support of military operations. Nations will rely on use of the EMS to achieve strategic advantage. According to Lt Gen (ret) Robert J. Elder, Jr., former Eighth Air Force Commander, "in the realm of national security, the military strategic goal is to ensure strategic superiority across the EMS as a means to enable friendly freedom of action in all domains, and to deny freedom of action across all domains to the adversary."⁶ This reliance on the EMS is evident in our increased use of wireless connections, radar, infrared applications, data links, and Global Positioning Systems (GPS).⁷ This dependency can also be a vulnerability as has been demonstrated in Iraq and Afghanistan.

Iraq proved to be a congested EMS environment with friendly electronic devices interfering with one another. In Afghanistan, electronic management has improved, but it is still a problem. In 2006, the Army was fielding ground-based Counter Radio-Controlled Improvised

Explosive Device EW (CREW) systems by the thousands, but it had to turn to the Navy and Air Force for experienced EW personnel to manage tactical programming and top-level EW planning and operations. While the Air Force EWOs performed admirably, their pre-deployment training was ad hoc and untimely. Some EWOs first learned about CREW systems and the challenges with working in a congested EMS environment while in theater. Future EWOs need to be better prepared. Unfortunately, the past decades have seen significant erosion in the Air Force EW knowledge base, and EW experts worry whether current training is adequately preparing today's EWOs.⁸

EWO Continuing Education Requirements

EWO professional development is constantly being identified as a significant deficiency. During the outbrief of the Combat Air Force (CAF) 2011 Weapons and Tactics Conference, one of the EW gaps identified in today's EW workforce was "limited EW professional development."⁹ At the operational level, the problem is obvious since most EWOs performing operational duties (as in an Air Operations Center) are not prepared to deal with the full range of EW issues. These operators are very competent in their specific platform weapon systems, but do not have the breadth of exposure to all EW disciplines needed to effectively work at the operational level. Lynn Berg, then Chief of Doctrine, Education, and Training at the Joint EW Center (JEWEC) was alarmed at "how out of touch they [EWOs] had become with technical trends, emerging target sets, and operational processes."¹⁰ In addition, the USAF EW Roadmap highlights the need for today's EWOs to understand adaptive planning, requirements, acquisition, programming, the modern EMS battlespace, and evolving EW technology.¹¹

Lt Gen Robert J. Elder, Jr., in a white paper titled *21st Century Electronic Warfare* makes nine recommendations to overcome shortfalls with today's EW environment. His fourth recommendation is to "Develop EW Leadership."¹² He declares that there is a critical need to develop strategic and operational leaders with expertise and experience in EW. Future conflict will be dependent on freedom of maneuver within the EMS. Since the contested and congested nature of the EMS is blurring the lines between EW and other military disciplines, EWOs must know how to integrate traditional EW, cyberspace, and spectrum management in all domains and across all operating environments.¹³ This means EWOs need to understand overarching theory and strategy, as well as tactical employment parameters in order to fully leverage the EMS for EW. According to Lt Gen Elder, "EW operators require the education and opportunities to develop themselves into practitioners of the strategic and operational art."

Even the joint EW community acknowledges deficiencies with integrating EW with other disciplines.¹⁴ Joint EW doctrine is currently being revised to show the shift in importance EW brings to operations. The current doctrine in Joint Publication (JP) 3-13.1, *Electronic Warfare*, dated 25 Jan 07, highlights EW's relationships to the global information grid, information operations (IO), intelligence, spectrum management, and space control.¹⁵ Due to the increasingly complex strategic environment, the 13 May 11 revision, which is still in coordination, expands the relationship of EW to other disciplines such as irregular warfare, cyberspace operations, navigation warfare, and directed energy.¹⁶ While incorporating this information into doctrine is a necessary first step, it means nothing unless today's EW force is properly trained on these topics. Currently, no dedicated training program teaches EWOs about these areas or how to best employ EW in this environment.

Existing Continuing Education Programs

Continuing education initiatives are not new. The JEW C and the Air Force already have EW training programs in place. In addition, under the label of professional development, other organizations within the Air Force have training programs tailored specifically to their functional professions. It is essential to explore the details of these programs and determine what benefit they might offer to EWO professional development. Five programs in particular are promising candidates. The first two are existing programs specifically dealing with EW training. Neither of these programs is mandatory. The next three are part of non-EW functional professional development programs. One is called the Acquisition Professional Development Program (APDP) and is administered by the Defense Acquisition University (DAU). The other two programs, sponsored by Air Force Space Command (AFSPC), are the Space Professional Development Program (SPDP) and the Cyberspace Professional Development Program (CPDP).

Joint EW Training

The JEW C at Lackland Air Force Base created the Joint EW Theater Operations Course (JEWTOC) to develop EW system operators into theater electromagnetic battlespace managers.¹⁷ The two-week JEWTOC focuses on EW mission areas outlined in JP 3-13.1. The course includes topics applicable to EWO continuation training such as EW Coordination Cell Structure, Counter-Improvised Explosive Device Operations and Trends, GPS Electronic Attack and Countermeasures, National Asset Integration, Intelligence Support to EW, Joint EW Reprogramming, and Spectrum Management Planning. The course is designed for experienced O-4s/O-5s. The student's parent organization is responsible for funding their attendance. Current enrollment averages about 19 joint students per class.

USAF EW Training

The 479th Operations Support Squadron (OSS) at Naval Air Station, Pensacola is responsible for teaching the EW Coordinators Course (EWCC). This course is non-mandatory, but designed to qualify experienced EWOs to perform duties as, or in direct support of EW coordinators for theater commanders and air component commanders. This 10-day program focuses on training areas such as EW Doctrine and History, IADS, Suppression / Destruction of Enemy Air Defenses, EW Planning, and Joint EW and Support Agencies. It is interesting to note that this course teaches blocks on IO, Navigation Warfare, Network Warfare, Intelligence Support to EW, and Cyber Awareness. This course also effectively incorporates course modules from other services such as the Army and Navy. Air Education and Training Command (AETC) manages enrollment and funds student attendance.

Acquisition

The Defense Acquisition Workforce Improvement Act requires all Defense Acquisition Workforce members to be certified for the positions they hold. There are three certification levels for each of the 15 career fields. Through DAU's core certification and "core plus" training courses, workforce members fulfill the training requirements for their respective career fields. While the APDP is extremely effective, the cost and complexity of the classroom instruction portion of the program makes it unaffordable to implement an equivalent from scratch at this time for EWOs. However, it is a good model of a sophisticated, self-paced, online program that is truly professional development and not just distance learning.

Space

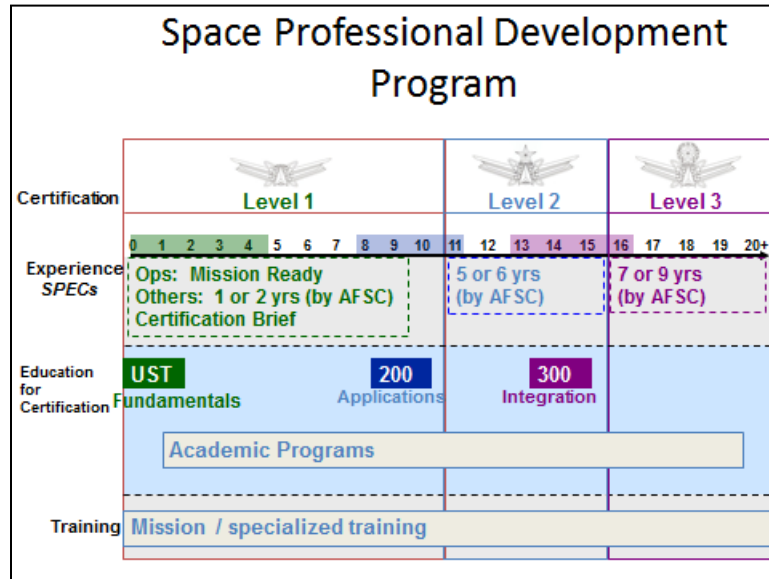


Figure 1. Space Professional Development Program (Source: AFSPC/AIMH)

Air Force Policy Directive 36-37, *Space Professional Development*, and follow-on Air Force Instruction (AFI) 36-3701, *Space Professional Development Program*, mandated the establishment of the SPDP. The Air Force has invested considerable resources to produce a fairly comprehensive program (Figure 1). The formally stated goal of the SPDP is “to produce highly qualified experts to build, operate, and integrate military space capabilities; master complex technology; and develop new doctrine and concepts of operations to achieve national security space objectives.”¹⁸ When asked whether the program is meeting its goal, the Chief of Space and Cyberspace Professional Management Office at Headquarters AFSPC stated that the program is successfully “creating a strong foundation of space understanding within the space professional workforce”.¹⁹

The National Security Space Institute (NSSI), part of Air University’s Eaker Center of Professional Development, is the Department of Defense (DoD) center of excellence for space education. It researches, develops and instructs courses in space system technologies,

capabilities, operational concepts, acquisitions and tactics in support of joint service strategies to develop certified DoD space professionals. NSSI was tasked to develop space professional development courses to grow space leaders from understanding fundamentals, through operational application, to strategic integration. In response it developed the Space 200 and 300 courses.²⁰ These courses are funded by AETC.²¹

The purpose of Space 200 is “to develop space professionals who think critically about the application of space power.”²² The course is 18 days and includes 159 hours of instruction. The NSSI graduates approximately 510 students per year. The curriculum in Space 200 focuses on space application and employment in the operational and tactical levels of war. The course is divided into two major areas: systems development and space power. The systems development area focuses on fundamentals of space science and acquisition. The space power area focuses on employment, integration, policy, doctrine, and law. Some specific course lessons which could be applicable to EW include Acquisition Fundamentals; Electromagnetic Spectrum; Space Control; Intelligence, Surveillance, And Reconnaissance (ISR); and Space/Cyber Threats.

The purpose of Space 300 is “to develop space professionals who understand national policy considerations and strategic thought within an international geopolitical environment.”²³ This course prepares space professionals for senior leadership roles. The course is 15 days and includes 113 hours of instruction. The NSSI graduates approximately 264 students per year. The Space 300 curriculum takes a more comprehensive look into geopolitics, acquisition, and integration. The geopolitical area enhances necessary skills to understand how and why the major policies, strategies, laws, and doctrines direct and influence the development and employment of space assets. Acquisition is comprised of multiple areas ranging from the development of future space systems to the ongoing relationships between contractors and

government agencies. Integration emphasizes employment of space assets in strategic and operational environments. Some specific course lessons which could be applicable to EW include Basic Funding/Cost Analysis, Requirements, Joint Operations, Command and Control, and Force Planning.

Cyberspace

The Commander of AFSPC was made the Cyberspace Functional Authority in June 2010. Since then, AFSPC created the CPDP, which is the cyberspace counterpart of the SPDP. The Air Force Institute of Technology (AFIT) is charged with developing and conducting the advanced cyber professional development courses (Cyberspace 200 and 300) outlined in the Cyberspace Plan. Since the program is relatively new, there is little data to determine whether it is truly producing “cyberwarriors” with the desired skill sets. AETC funds both Cyberspace 200 and 300 with an estimated yearly cost of \$2.7 million.²⁴

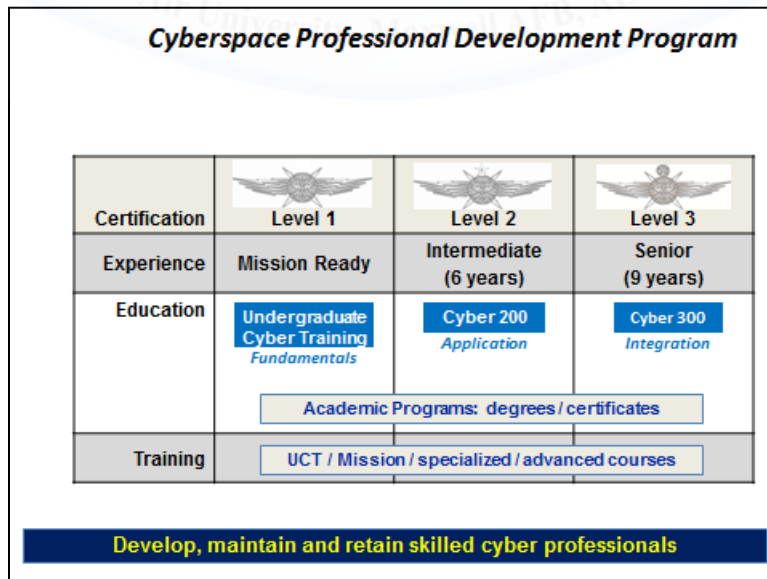


Figure 2. Cyberspace Professional Development Program (Source: AFSPC/AIMH)

The Cyberspace 200 course consists of 101 hours of instruction for approximately 400 students per year. Students graduating from Cyberspace 200 will be expected to apply the skills toward tactical and operational computer network operations and to understand current cyberspace operations.²⁵ This course is focused solely on technical cyberspace operations and has no utility for EWOs.

The Cyberspace 300 course consists of 66 hours of instruction for approximately 230 students per year. The focus of Cyberspace 300 is to expose students to operational and strategic issues in order to better integrate and apply cyberspace capabilities in joint, interagency, and multinational operations.²⁶ Course topics include Cyberspace Battle Management, Cyber Threats, Cyberspace Integration, Cyberspace Force Development, Cyberspace Doctrine and Policy. Some specific course lessons which could be applicable to EW include Cyberspace Operations, Planning, and Integration.

In summary, there is an efficient and effective way to address the shortfalls of the training and education dimensions of EWO professional development in the near term. The recommended course of action is to build a program from applicable courses already offered and funded by various institutions as outlined above, and to flow EWOs through them with a timing and sequence that makes sense to their career progression. The SPDP should be used as a model for a similar EW program and as a guide to assist the EW community through the processes needed to gain official approval for a developmental program.

EW Career Development Opportunities

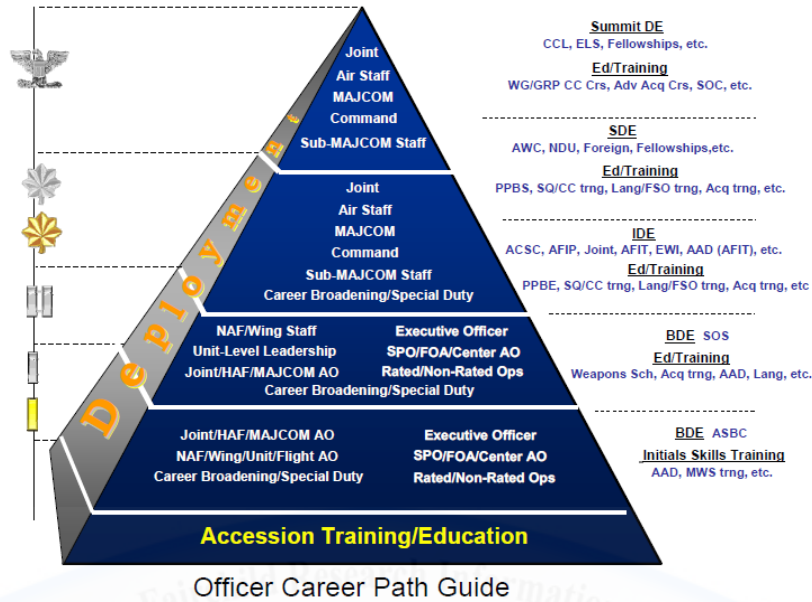


Figure 3. Officer Career Path Guide (Source: CAF Development Team Slide)

Having outlined above a feasible and effective approach to formalizing EWO training and education, this paper will now move to the second part of professional development – career development. The specific proposed approach is simply a maturing of the CAF DT Process. According to its charter, the vision of the DT is to “develop exceptional CAF leaders through deliberate management of officer training, education, and experience.”²⁷ The process begins with the senior rater, commander, and supervisor, for their involvement is essential to the initial stages of professional development of Airmen. Their input is critical for making developmental decisions about individual members and identifying and maximizing the capabilities of Airmen. They also play an integral role in supporting all aspects of individual development through mentoring and feedback as well as communicating an individual’s developmental plan to the DT.

The DT uses a process outlined in AFI 36-2640. Some key excerpts are as follows:

- DTs will identify the education, training, and experiences appropriate for officers within each functional community based on current and future requirements.
- DTs will understand career field policies, plans, programs, training, and actions affecting career field management and development and will take these issues into consideration when making personnel decisions and vectors.
- DTs will make vectors based on projected/anticipated and aggregated requirements by level and position type.
- DTs will use career planning diagrams (i.e. career development pyramid) to make informed vector recommendations.
- DTs must consider cross-functional developmental and utilization requirements when recommending vectors for their officers.

As these actions indicate, DTs play a critical role in developing officers to support current and projected mission capabilities. The DT Charter states that senior leadership of each career field will become familiar with the people assigned to their functional area, making assessments of member potential for future opportunities; prepare senior leaders with a comprehensive understanding of both functional and institutional personnel requirements; and balance institutional and functional requirements for utilization of individual officers.²⁸ One could argue this is currently not being done well for the EW community. The phrase “senior leadership of each career field” is very generic and easily misunderstood. Does this mean the B-52 Wing Commander (who is typically a pilot) is the senior leader responsible for EWO careers? Or should there be a functional expert senior leader involved? If the EW strategic environment is so complex and always changing, would a non-EWO be in the best position to offer development recommendations for EWOs? Other functional career fields do not operate this way. The seemingly obvious solution is to mandate that an EWO sit on all DTs that are considering EWOs.

Recommendations

The strategic environment has changed with the evolution and diffusion of sophisticated technology enabling all manner of military, civilian, and rogue actors to operate and fight in the ever more crowded and contested EMS. It is essential that USAF EWO professional development also evolves into a more sophisticated and effective program. To better prepare EWOs to meet these challenges, we need to first approve an EW continuing education plan to synchronize necessary knowledge, skills, and abilities with career milestones. Additionally, it is paramount to ensure EWOs attain critical career development experience and exposure through carefully managed Air Force and joint assignments. These steps are essential both to equip EWOs to better perform their critical mission today, and to ensure they are competitive with other communities within the Air Force for senior leadership positions, so that they might help guide the development of the force of tomorrow. Today's senior EW leadership needs to provide better advocacy and oversight of their junior EWOs to bootstrap this process into existence. With the concurrence of the Air Staff, this can be done with two minor adjustments within the current system: (1) include a senior-level EWO on the CAF DT, and (2) appoint an EWO to act as the career functional representative on the Air Staff.

Mandate Existing EWO Continuing Education Opportunities

In today's fiscally constrained environment, a new education program should leverage existing programs, organizations, and courses to the maximum extent possible. The SPDP offers the most relevant, robust, and effective core curriculum from which to start. An EW continuation training program should be organized similarly to the SPDP and include two separate mandatory courses: EW 200 and EW 300. Like their space counterparts, EW 200 will

focus on tactical and operational issues while EW 300 will focus on strategic aspects of EW. The initial syllabus for each course should follow the Continuing Education Requirements section of this paper, which were derived from training and knowledge shortfalls identified in the USAF EW Roadmap, EW Doctrine, and recommendations from conferences and published articles. These topics are listed below along with the organizations which currently teach them (in parentheses).

Proposed course content for EW 200:

- Electromagnetic Spectrum Management (479 OSS, JEWCC, NSSI)
- ISR (479 OSS, JEWCC, NSSI)
- Intelligence Support to EW (479 OSS, JEWCC)
- *Space Control/Space Support to EW (NSSI)*
- EW Support to IO (479 OSS, JEWCC)
- Air Operations Planning (479 OSS)
- *Cyber Operations and Planning (AFIT)*
- Policy and Doctrine (479 OSS)
- Threats (479 OSS, JEWCC, NSSI)
- Navigation Warfare (479 OSS, JEWCC)

Proposed course content for EW 300:

- Requirements (JEWCC, DAU)
- *Acquisition Fundamentals (DAU, NSSI)*
- Joint Operations (JEWCC, NSSI)
- Joint Force Planning (JEWCC, NSSI)
- *Programming (DAU)*
- EW and Cyber Integration (JEWCC, AFIT)
- Other Service Perspectives (JEWCC, 479 OSS)

These courses are already established and funded. One can discern that, with minimal changes, the 479 OSS EWCC can become the EW 200 course and the JEWTOC can become EW 300. Two additional topics recommended for EW 200 are space control and cyber operations and planning. It would not be difficult for the 479 OSS to work with the NSSI and AFIT to get the lesson plans in order to include these topics in their curriculum. For EW 300, the JEWCC

would have to make a similar adjustment to include the acquisition fundamentals and programming lessons in the curriculum. With minimal effort, the Air Force can craft an EWO professional development track from existing courses. The remaining actions are to mandate each EWO attend the courses in a timely fashion and determine who will fund student enrollment. Using the SPDP as a model will help guide the EW community towards completing these unresolved issues.

Include an EWO on CAF DTs

A DT is composed of senior leaders from various MAJCOMs including officers with experience as Wing Commanders, Vice Commanders, Group Commanders, and other commander equivalents.²⁹ This composition of board membership does not adequately represent a functional cross-section of the Air Force, specifically under-representing non-pilot rated officers. The membership of the two most recent developmental boards illustrates the point. Members on one board consisted of 18 pilots, 1 navigator, and 1 air battle manager; while the other board consisted of 16 pilots and 4 combat system officers.³⁰ In order to provide equity to all the candidates, there should at least be one functional representative on the board for each career field considered. Every DT should include an O-6 EWO.

In accordance with AFI 36-2640 paragraph 3.1.1, representatives from cross-functional communities are permitted to attend applicable DT sessions. The representative does not need to be a sitting commander. Since there are few sitting EWO group or higher commanders (a problem this proposal is trying to correct), the DT representative will initially have to come from within the Air Force-sanctioned Electronic Warfare Advisory Group (EWAG). The EWAG is a chartered action group of Colonel's from across the Air Force who debate EW issues being considered for coordination into the Air Force corporate structure. At least one EWAG session a

year should be devoted to preparing for CAF DTs. During this EWAG session, critical EW billets should be identified, and MAJCOM representatives should be able to provide insight into potential candidates to ensure the right person is matched to the right position. Not only will this improve the individual's professional development, but will help the EW community and the Air Force as a whole.

EWO Assigned to Headquarters USAF

Almost every career field has an acting Functional Manager (FM). AFI 36-2640 paragraph 1.2.6 designates FMs and directs them to provide day-to-day management responsibility over specific functional communities. While FMs should maintain an institutional focus with regard to resource development and distribution, they are also responsible for ensuring their special mission areas are equipped, developed, and sustained to provide Air Force capabilities. The Directorate of Operations Force Management (AF/A3O-A) located at the Pentagon is the designated FM for the 12X Air Force Specialty Code that includes EWOs, CSOs, and Navigators. The Operational Training Division (AF/A3O-AT) should be responsible for EW professional development, but currently no one is performing this task.³¹ This issue can easily be corrected. Once an EWO is identified to perform duties in AF/A3O-AT, this person should also be required to attend the EWAG meeting on EW professional development. A primary action item for this person would be to identify critical EW positions within the Air Force, as was highlighted in the Air Force EW Roadmap.

Challenges

Implementing these recommendations will face several challenges including changing Air Force culture, realigning organizational structures, and obtaining funding. AFPC's response when asked about developing an EW Professional Development Program was to question why EWOs should be treated differently than other aviators. This illustrates the difficulty with convincing leadership that EW is a unique cognitive discipline that requires careful cultivation over the course of a career, just like the specific cognitive and motor skills of pilots. This cultural change will have to start at the top and will be most effective if fostered within Air Combat Command (ACC), since they are the USAF Executive Agent for EW.

ACC should also host the EWO professional development program in similar fashion to the way AFSPC handles the SPDP and CPDP. Funding will be a significant issue. While building an organization similar to NSSI is desirable, in today's fiscal environment, it is not feasible. Instead, existing organizations and training programs should be leveraged as much as possible. Additional funding to 479 OSS and JEWCC to implement minor modifications to the EWCC and JEWTOC can cover the proposed course objectives. These challenges can be overcome with little risk and effort relative to the long-term payoff.

Conclusion

Unlike the acquisition, space, and cyberspace career fields, a formal EWO professional development plan does not exist. In today's strategic environment, EW is becoming more critical to enabling effective operations. The need to provide persistent EW effects across the EMS to shape the virtual and physical battlespace has replaced the narrower concept of EW as a means to defeat the enemy's IADS. Conflicts will continue to provide the ever-evolving

challenge of a diverse, rapidly changing and complex signal environment consisting of friendly, civil, enemy, and rogue signals making use of both military and COTS technology. EW will cross into domains such as space and cyberspace, and support mission areas such as intelligence, IO, spectrum management, and navigation warfare (to name a few). This confluence of factors drives a requirement for additional professional development for today's EWOs, who need to keep abreast of the changing operating environment of conflict.

Professional development can be defined as a combination of continuing education and career development. The EW community can build a continuing education program by using the SPDP as a guide for organization but leverage existing EW-specific programs from other units. The end result will be two mandatory courses for EWOs to take during their career: EW 200 and EW 300. By adding existing courses from the NSSI and DAU to their established curricula, the 479 OSS can expand the EWCC to become EW 200, and the JEWCC can expand the JEWTOC to become EW 300. These new EW courses will cover well-documented educational shortfalls. The right EWOs need to be in the right positions in order to gain the experience they need to be effective, and in order to be competitive with their peers and promotable to senior and strategic leadership positions where they can fight and shape the future force. While the current DT process is maturing, more can be done to ensure the careers of EWOs are properly guided. Mandating that EWOs sit on DTs and having an EWO become the EW Functional Manager on the Air Staff are obvious and fairly painless first steps. An improved education track, combined with well-managed career development opportunities, will better prepare EWOs to meet current and future operational challenges.

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Notes

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography)

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 - ⁴ John Knowles, "USAF – Getting Back into EW", 6.
 - ⁵ JP 3-13.1, 25 Jan 07. I-1.
 - ⁶ Robert J. Elder, Jr., "21st Century Electronic Warfare", 1.
 - ⁷ USAF EW Roadmap, 11.
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 - ¹³ *Ibid.*, 1.
 - ¹⁴ USSTRATCOMs EW Capabilities Based Assessment identified several gaps in joint EW training, doctrine, and leadership.
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