Abstract
Recent rapid decreases in Air Force Explosive Ordnance Disposal personnel manning has raised questions of how to stabilize this essential emergency response capability. The amount of knowledge lost every year is shown in increasing retirements, voluntary separations, and battlefield losses. This has driven a corresponding fading of conventional ordnance handling skills due to personnel being primarily exposed to Improvised Explosive Devices seen over the past ten years in Iraq and Afghanistan. This research proposes capturing the knowledge of individuals before they leave the Air Force through introducing federal government civilians into explosive ordnance disposal units to foster knowledge continuity. Further, adopting a personalization strategy, with the supporting use of codification would provide a clear direction for KM in the future. Finally, the continued funding and support of the EOD community of practice would allow for the quick and easy spread of knowledge for an organization that operates worldwide.

1. Introduction
The United States workforce is increasingly mobile in today’s society and maintaining the correct personnel mix is vital. The problem of high turnover is not unique to private sector organizations. This paper will present a case study of one Air Force career field that is dealing with high turnover due to retirements and a highly mobile workforce, resulting in a potentially massive loss of emergency response knowledge.

The wars in Iraq and Afghanistan have strained the Explosive Ordnance Disposal (EOD) career field. Air Force EOD is operating at 77 percent manning while conducting counter Improvised Explosive Device (IED) operations in Iraq and Afghanistan, and simultaneously supporting emergency response missions around the globe. The related recent exodus of its Airmen is causing the loss of valuable tacit knowledge that could save lives.

The knowledge lost from mid-career Airmen departing for new work opportunities and seasoned veterans retiring in large numbers has left the field with an expanding knowledge gap. Critical knowledge is walking out the door every day with regards to IED response, specific explosive tool usage, and how to conduct an explosive threat assessment. This research addresses fundamental questions underlying these issues:
1. How do we retain the knowledge that is necessary to complete this highly dangerous mission?
2. What knowledge management strategies would be best suited for Air Force EOD units?

This paper will look at KM issues facing the EOD career field as more Airmen depart, assigned manning dwindles, and core safety knowledge is lost. This effort will start with a clear definition of KM. Then a working definition of both the retiring workforce and transient workers will be provided. It will then delve into what EOD is, and the current situation facing this career field. It will conclude by discussing how EOD personnel share knowledge and the alternative opportunities that exist to meet the career field’s changing knowledge needs.

2. Knowledge Management (KM)
Knowledge is not simply information or data, but a combination of the two with some added context. It is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information [10]. Organizations draw upon this asset in order create situations of competitive advantage [20]. Knowledge is found at all levels in an organization and success often depends on leaders synthesizing knowledge assets to achieve organizational synergies [8].
In the military, as in the private sector, there are two types of knowledge that are found: tacit and explicit [6]. Tacit knowledge, created through experience and social interaction, is held by individuals as well as groups [10]. Due to this, it can be difficult to codify, as tacit knowledge is embedded in organizational routines that no one person completely understands [18]. While tacit knowledge has a personal quality that makes it hard to formalize and communicate, [20], explicit knowledge is more readily transmittable in formal language making it easier to legitimize [6]. The interactions between tacit and explicit knowledge is how organizational knowledge is created [20]. Sharing knowledge across the organization is described by Hansen and von Oetinger [15] as a T-Shaped manager’s horizontal role. With an understanding of what tacit and explicit knowledge are, and how they work together, a basic definition of KM can be adopted.

There are many definitions for KM in the literature. KM spans three widely-agreed upon main components: knowledge generation, knowledge codification, and knowledge utilization [5]. It embraces the active management of expertise [7], cultivation of tacit knowledge, the maintenance of explicit knowledge, and the management of knowledge applications to gain a competitive advantage [18, 21]. For the purpose of this discussion knowledge management is defined as the active management and support of organizational expertise [7].

3. Methodology

The methodology used to undertake this case study was to conduct interviews, collect statistical data from the EOD Community of Practice (CoP), and collect Air Force EOD demographics from the Air Force Personnel Center. The interview questions are listed below:

- How many Air Force EOD personnel are members of the CoP?
- Who makes up the CoP population?
- What are the posting procedures for uploading information to the CoP?
- Who is responsible for ensuring the accuracy and usefulness of the information on the CoP?
- Are acceptance rates tracked on information submitted to the CoP compared to what is actually posted?
- What percentage of EOD codified knowledge transfer is carried out by using the CoP?
- Are there any current plans to relocate the EOD CoP when Air Force Knowledge Now (home of the EOD CoP) is shut down due to lack of funding?

There are currently 988 active duty EOD Airmen serving in the Air Force [4]. The EOD CoP itself has approximately 1000 active members. CoP membership is comprised of Air Force, Army, civil service personnel as well as EOD-affiliated contractors. The Air Force EOD military personnel who actively participate on the CoP range from junior enlisted Airmen to the most senior EOD USAF officer (a Lieutenant Colonel) [3].

4. EOD and the Current Situation

EOD is a profession that handles all emergencies that contain explosive hazards. The more commonly known civilian name for these responders is the bomb squad. In the civilian sector, the bomb squad is located in city police forces or fire departments. In the Air Force, EOD is located in the Civil Engineering Squadron along with related emergency management functions such as the fire department.

All four Department of Defense (DoD) services have EOD functions and each service EOD force handles a core task. Army EOD is the office of primary responsibility for ground ordnance. Navy EOD is the functional program manager for all the DoD EOD assets, and the office of primary responsibility for sea ordnance. The Marine EOD forces, which are the smallest, are responsible for inerting ordnance used for training purposes. Finally, Air Force EOD is manages aviation and nuclear ordnance. All EOD operators, regardless of service though, have the same essential training and missions tend to overlap.

Within the Air Force, due to many forces, the existing EOD manning processes are not following the retention model historically used by USAF human resources managers. The Air Force retention model depends on a system of over hiring needed skills. When normal (i.e. historically consistent) attrition occurs, the remaining personnel are sufficient to meet congressionally-authorized personnel strength levels. Yet, EOD retention has been abnormally falling over the past five years [4]. Over the same period, the US has been enmeshed in an asymmetric conflict where the enemy’s weapons of choice are improvised explosives. This has created a situation where EOD personnel have become high-demand, low-density assets. In 2011, the career field is only 77 percent manned [4] and its
personnel now face a gruelingly high operations tempo in order to meet combat needs.

The EOD career field is experiencing decline, despite the Air Force trying to promote its growth. Between 2008 and 2010, the Air Force increased authorized EOD manning by 159 positions; raising total authorized enlisted EOD end strength from 1,128 to 1,287 [12]. Nonetheless, with the washout rate at the EOD School hovering around 40 percent, and the increasingly high turnover rate of existing EOD Airmen, it is difficult to fill the increased authorizations. To address this, reenlistment bonuses for EOD airmen have increased 133 percent since 2007. Experienced Airmen who choose to say on active duty can receive seven times their monthly base pay multiplied by the number of years for which the member reenlists. For example, a journeyman EOD technician earning $2620 a month and reenlisting for 4 years would receive slightly more than $70,000 (7 x $2620 x 4). The total allowable bonus may reach as high as $90,000.

Additionally, the Air Force has authorized Special Duty Pay since 2008 in order to retain specialized EOD personnel. Qualified EOD Airmen receive 150 dollars a month due to the increased hazard of their job. Even with the increased monetary incentives though manning in the Air Force EOD career field has decreased to a 2011 low of 77 percent of authorizations [4]. SDAP has not been the needed answer; people keep leaving and their inherent knowledge walks out the door with them.

Countering this movement, EOD’s ratio of deployment-to-home time “dwell” has also changed. In the past, personnel could expect 12 months of time at their home station for every six months of being away. Today, operational pressures have forced this 2-1 ratio to be abandoned in favor of deploying the EOD Airmen on a much tighter cycle, removing valuable deployment stability and predictability. The average deployment-dwell cycle for today’s EOD Airmen is now approximately six-months deployed for every six months at home. Thus, for every day deployed, the EOD Airmen get only one day to spend with their families. This is further compounded by the fact that all pre-deployment training is conducted during their six months at home. This makes the actual deployment dwell cycle closer to six months deployed, five months home, and one month pre-deployment training. Seven months of the year is spent away from members’ homes and families.

An added stressor to the families of EOD Airmen is the nondeployment-related additional training and mission related trips that pull members further away from home every year. EOD Airmen support the United States Secret Service and the Department of State with security missions for the President, Vice President, foreign dignitaries, and other designated VIPs. Further still, personnel are also kept away from home to conduct range clearances, advanced explosives training, and emergency response training required by the Air Force to advance through the EOD skill qualification levels and get promoted.

A final reemerging factor that appears to be affecting the EOD Airmen turnover intentions is battlefield stress. By the very nature of their mission, EOD operators are encountering IEDs, destroyed military and civilian vehicles, dead bodies, and are often engaged in battles with enemy forces. This direct contact with the peril of war has added an additional stressor on the EOD Airmen. The rise of Post Traumatic Stress Disorder, and the fact that most EOD Airmen know someone who has been killed or severely wounded, shows that stress of this job is all too real. For the reasons described in the background of this issue, it is of vital importance that the knowledge in the EOD career field be captured and key knowledge workers retained before important knowledge is lost as EOD members flock out the military door under the effect of these stressors.

5. EOD Knowledge Competencies

The Air Force EOD career field handles all emergencies that have an explosive element. EOD is thus responsible for nine mission areas [2].

- **Aerospace vehicle launch and recovery** supports aircraft sortie generation and Space operations by responding to airfield emergencies to render safe ordnance and aircraft explosive components during in-flight and ground emergencies or crash situations.
- **Force protection** protects people and property by eliminating or mitigating explosive hazards created by known or suspected criminal and terrorist devices.
- For **Weapons of Mass Destruction (WMD)** EOD will provide full-spectrum response capability to nuclear, biological, chemical, radiological, incendiary, conventional explosive ordnance and IEDs. EOD teams respond during the crisis management phase of the incident and provide initial response, situational analysis, provide advice to the command authorities on hazards and protective measures, and support regional and specialized support teams as required.
- During a **Nuclear weapons incident and accident** EOD will provide immediate initial support to the incidents or accidents.
• **Unexploded Explosive Ordnance (UXO)** recovery operations is the clearing of UXOs during runway and airbase recovery operations and neutralizing hazards from explosive related incidents which, because of unusual circumstances, present a threat to operations, personnel, property, or material.

• While conducting **Operational range clearances** EOD works together with range management offices and environmental agencies to clear operational ranges, and test and evaluation ranges so that Air Force pilots and engineers can train or test live ordnance is a safe operational capacity.

• EOD supports **Mortuary Services** by providing the removal of ordnance left on or embedded in casualties arriving back to the United States.

• EOD also conducts **Federal Agency and Civil Authority Support** by assisting Federal and civil authorities with terrorist or other criminal acts, accidents, found explosive items, and other requests for support.

• EOD also provides **Base Populace Training** on ordnance hazards and recognition, mine awareness, terrorist bomb search procedures, and personnel protective measures.

All of these responses have years of organizational knowledge embedded in their processes. These core EOD responsibilities are executed by expert knowledge workers with very unique skill sets. As these people leave, their tacit knowledge is departing with them.

6. Retiring and Transient Workers

A major threat to organizational knowledge is personnel turnover, because much of this knowledge resides in the minds of the individuals [23]. The major sources of USAF turnover are due to retiring and transient workers. Retiring workers are those military members with more than 20 years of active federal service and eligible for retirement at 50% of their base pay. Unlike the civil sector employees, many military personnel will have a second career and their commitment to their job may diminish once they are vested. Moreover, most retirement eligible personnel are in their early 40s and so can fully expect another full post-military career. This is a driving factor in many members’ decision to separate after 20 years of service.

There are several other factors affecting the retirement of the current senior EOD service members. One factor is the lengthy deployments to Iraq and Afghanistan, and the increasing frequency with which these deployments occur. As Peter Cappelli [9] states, “Employees had been retiring from companies for generations without causing as much as a ripple in corporate planning. The reason for the panic now is that many organizations have just begun to realize that they have no arrangements for replacing these retiring workers…” The Air Force is in this situation, because of the high number of senior enlisted EOD Airmen retiring, the reduced influx of new EOD Airmen due to an approximately 40 percent attrition rate at the Navy-led joint EOD School, and the fact that a new EOD Airmen takes two years to train and develop before they can work operationally. This was not a problem until a more transient workforce started leaving the Air Force EOD field compounding the retirement issue.

Transient workers are a mobile work force that is prone to switch jobs multiple times during the lifespan of their careers. Transient workers have been referred to as mobile workers and knowledge nomads [22]. For the purposes of this paper, the transient workers referred to are the enlisted EOD military workers, who have not attained the 20 years needed for military retirement. As they leave service in greater numbers, dwindling manpower levels have led to serious retention issues [4].

Normally, the military by design lends itself to the transient worker model. Retention modeling forecasts how many personnel the Air Force needs to maintain to accomplish its missions and assumes that a significant number of members will not pan out (i.e. “become transient”) over time. The military as an organization has always had a portion of its service members that are transient. Members separate may prior to retirement for any number of reasons (e.g., incompatibility with the military lifestyle, better civilian job opportunities, discipline issues, etc.).

To fully grasp how transient workers can create a retention issue it is important to understand how the Air Force manages their personnel. The Air Force recruits a projected amount of people in each career field, expecting losses due to normal attrition as they get out of service at the end of their commitments (enlistment contracts that typically last for four to six years), cross train into other career fields (jobs), or take other options (get an officer commission, work as a recruiter, etc.). If a certain career field ends up with too many personnel, members are given opportunities to cross train or allowed to separate before their contract is completed. On the other hand, if the Air Force appears to be falling short in a career field, additional bonuses (monetary incentives) are offered in exchange for a longer service commitment in that career field. The latter is the situation for the EOD career field; however, the monetary incentives this retention model is based upon are losing their effectiveness.
7. Alternative Opportunities that are taking EOD Knowledge from the Air Force

The high unemployment numbers prevalent in the civilian sector have not affected the employment opportunities for EOD Airmen. In the post 9/11 world, there is an emergency response and security sector job boom. EOD Airmen have noticed. Higher pay and stability for their families are attractive offers after multiple deployments, highly dangerous environments, and low pay compared to contractors working similar jobs.

Since September 11, 2001, the homeland security job environment has grown in both the government and private sectors. These new job opportunities are now enticing Airmen to leave EOD, follow careers in the bomb disposal field, and spend more time with their families. An example is the Bomb Appraisal Officer (BAO) position with the Transportation Security Administration (TSA). These workers train TSA officers at the nation’s airports on x-ray identification of explosive hazards, and conduct on-site appraisals of any potential explosive hazards found by the TSA officers. BAOs entering service can start off earning more income than an Air Force Airmen or Sergeant makes after five years. For an EOD Airmen approaching reenlistment, the BAO job is an attractive option that provides stability, more time at home, and a potential salary increase.

The BAO position is one example of nonmilitary EOD work, but there are many other opportunities available. Besides the local police or fire department bomb squads, there are also jobs in environmental land remediation of old bomb training ranges, explosive lab workers for the Federal Bureau of Investigations (FBI), security support for the United States Secret Service (USSS), and countless other contractor opportunities in training and ordnance disposal. These more stable nonmilitary jobs are attractive to the families of EOD Airmen.

Family influence is a significant influence when discussing EOD Airmen turnover intentions and alternative work opportunities. The dependants of EOD Airmen spend a great deal of time without their significant others. This time apart can also be compounded by the worry and stress put on the family because of the inherent dangerous nature of the EOD job. According to the Air Force Civil Engineer magazine 2010 Almanac [1], EOD operators conducted more than 6,500 missions, including more than 1,625 IED defeat operations. It is not surprising, with this dangerous high operations tempo, that the family-work dynamic is difficult for Airmen employed in this career field.

8. Knowledge Sharing in EOD

Knowledge sharing practices in EOD concentrate on the transfer of tacit knowledge, but the sharing of explicit knowledge plays a very important supporting role as well. This KM process is an 80 percent concentration of tacit knowledge transfer with an important 20 percent explicit knowledge support component [14]. It is important to understand exactly how EOD currently shares (transfers) their tacit and explicit knowledge. EOD Airmen depend and thrive on new knowledge about how to do their job more effectively and safely. This knowledge transfer takes place through a thriving community of practice (CoP), formal training schools, conferences, and through informal networking after duty hours. Each one of these knowledge-sharing events is of vital importance and will be discussed further.

The use of the CoP is an important tool for the EOD community. This is supported by literature that has demonstrated that CoPs have improved organizational performance in many diverse companies [24]. EOD requires a great deal of codified knowledge to be shared throughout the community to complete their mission with the safest possible methods. When working with explosives, especially improvised or damaged ordnance, the danger threshold is high and the operator only gets one shot to make the situation safe. EOD has the saying, “Initial Success or Total Failure”. This emphasizes the need to codify the knowledge required to safely deal with each situation, and share this knowledge across the entire EOD career field.

Explicit knowledge sharing is accomplished via two KM technology systems. The first is the EOD Incident Management System (EODIMS) [2] that informs the chain of command about incident details and allows the knowledge generated from the response to be shared across all military EOD regardless of service branch.

Based on the sensitive nature of explosive emergency response information an example of how the knowledge is captured is useful. Following an incident the EOD knowledge worker (senior EOD operator on the response) will generate an EODIMS report. The EODIMS report uses preset terms and definitions that are common for all ordnance and response procedures. The completed report is then submitted to the EOD leaders and managers in the responding EOD knowledge workers’ work center. Following approval from the EOD local
management, the report is subsequently submitted for review and approval at a central management office (Air Force Major Command) staffed with higher level EOD knowledge workers. If anything out of the ordinary is found during any level of review, the report is sent back to the originator for further explanation or correction. Only after these validation checks by more experienced knowledge workers is the EODIMS report finally published on the information system for all EOD to reference.

Each EOD response reported in EODIMS will generate new knowledge, because of all of the other variables that surround the ordnance item like weather conditions, physical location, ordnance orientation, and surrounding facilities. The new knowledge that is recorded in the EODIMS database is distributed through messages to the EOD community, and new knowledge developed from these operational explosive responses are reviewed for appropriate changes to ordnance publications and training. Since every emergency explosive response incident is captured and codified on the EODIMS system, it is a very powerful tool for KM.

The second information system is the Air Force Knowledge Now (AFKN) CoP. The CoP is a repository of knowledge that is widely used to share administrative knowledge, training knowledge, knowledge maps, and knowledge owners throughout the EOD career field. The EOD CoP was the 2008 Air Force award winner for best CoP in the Air Force [3]. The CoP stores and shares explicit knowledge. Moreover, each piece of knowledge remains linked to the knowledge worker who created it. This allows the knowledge receiver to have the ability to contact a knowledge expert in a given area to gain greater context or clarity in the knowledge being transferred.

The knowledge stored on the CoP is validated by the knowledge owner at each level. The CoP does provide a basic user level where anyone can post any information. For professional use though, the CoP has two higher levels for EOD central management offices (Air Force Major Commands), and the functional and technical experts for EOD (Air Force Civil Engineer Support Agency). These two professional levels are well marked, and all knowledge posted is validated by knowledge owners (EOD senior personnel who maintain the CoP) and senior EOD managers.

The CoP is only accessed by invited members that have an EOD affiliation. With approximately 1000 EOD AFKN CoP members [3], and only 988 active Air Force EOD Airmen [4], it is fair to say that the vast majority of EOD Airmen are members of the CoP. The highest volume of activity in 2011 was approximately 20 percent of the active uses (224 EOD CoP users) logged onto the CoP at the same time [3]. Unfortunately for further study in this area the EOD CoP statistics page does not track daily usage statistics, or acceptance rates for submitted content to be posted.

The CoP is an invaluable support system for knowledge sharing within EOD, but the funding for site is in real danger of being cut. The ramifications of this could be the loss of an important knowledge transfer support network, especially with the shortage in manning. On 4 March 2011, the Air Force sent an email announcing that the AFKN CoP will lose all funding in June 2012. Based on interviews with a CoP knowledge owner and EOD leaders, there is no current plan to relocate the CoP to prevent loss of the codified knowledge located in the system.

Training and conferences also provide a tacit knowledge-sharing platform for EOD operators from all four services. Additional formal training schools are a required element of the EOD operators’ service. The training allows more senior knowledge workers in EOD to share their knowledge through structured course work and war stories. This mix of formal and informal networking between EOD knowledge workers from all the service branches is how tacit knowledge is shared and new knowledge is created in the EOD field. These advanced training schools are essential to meet the need for highly skilled bomb disposal operators. The training venue allows senior EOD trainers to evaluate current knowledge levels of EOD field workers, and provide co-workers with more knowledge, both tacit and codified, so that they can grow into future senior EOD knowledge holders.

Conferences are also a medium in which EOD operators from all the service branches share knowledge, and explore new KM initiatives. The Global EOD Conference is held in early May every year to coincide with the annual EOD memorial. The memorial is held to honor the fallen EOD warriors who died conducting EOD operations around the globe. Having the Global EOD Conference at the same location, and leading into the memorial ensures that all the senior EOD knowledge workers will be in attendance. This provides opportunities for senior EOD leaders from all four military services to engage with the field EOD operators and discuss new and emerging threats and technologies, building and sharing knowledge across the board. The DoD Fire and Emergency Services Conference is another venue used by Air Force EOD to discuss Air Force specific issues. Knowledge sharing at the Fire and Emergency Services Conference is specific to Air Force EOD programs and initiatives, and allows EOD leaders to share best practices, new technology that is being adopted by the Air Force, and any new
safety issues that have not been pushed to the field yet. The conferences overall tend to attract the more senior knowledge workers in EOD, and their expertise is harnessed to solve operational problems to include the transfer of knowledge throughout the career field. These avenues of knowledge transfer are important, but the primary knowledge-sharing venue is the home station training program.

The network of knowledge sharing for EOD is large, but the main opportunity for EOD units to share and create their knowledge is from the in-house training and practice conducted at their home station. Air Force EOD members train extensively at their home units and knowledge is shared on a daily basis. Each new EOD Airmen is assigned a mid-level EOD journeyman to learn from, and the mid-level EOD member is simultaneously mentored by a seasoned EOD master technician. This knowledge transfer forum allows for interaction between all of the EOD knowledge workers regardless of years of experience. The in house training scenarios are taken from real world events that were captured in incident reports and posted in the EODIMS database. All knowledge input is valued at these training and response practice sessions. The apprentice model is used to transfer tacit knowledge to the new EOD Airmen, while still valuing their inputs as a fresh look at what is sometimes an old problem.

9. KM Issues with the Declining EOD Force

As the EOD force declines in numbers, so does its knowledge. Several factors have become apparent as the wars in Iraq and Afghanistan are approaching the decade milestone. First, there is a lack of personnel to train new EOD Airmen when they reach their first duty station. Second, there is a knowledge gap created by the loss of mid-level and upper-level EOD enlisted management. Finally, the transfer of codified knowledge is becoming the sacrificial lamb on the altar of the budget-cutting block. Each of these is important to KM for the EOD career field.

A major issue facing the KM of EOD is the training of future EOD Airmen new to the EOD career field. In the past, new EOD Airmen would be placed in the role of an apprentice that would learn from one EOD noncommissioned officer. This relationship allowed the Airmen to gain the tacit knowledge from a qualified EOD operator tactically proficient in all aspects of their job. With the current deployment cycle, EOD no longer has this luxury due to the numbers of EOD personnel being deployed at any given time. Every five months or so, the apprentice has a new trainer since the last one is deploying. The trainee himself is deployment eligible after approximately 12 months when they complete their upgrade training to a new journeyman.

The interim solution is to hire retired military EOD experts to train the new Airmen and pass on their tacit knowledge. The limitation of this approach is that these contractors are paid for with government war funding which is separate from the Air Force’s basic budget. This means that when the wars in Iraq and Afghanistan end, the contractors are no longer funded, and the new knowledge gained from training the Airmen in recent years is lost.

In order to understand why the EOD contractors are not a permanent KM fix for the EOD program, it is important to understand the military, government civilian, and contractor relationship in the Air Force. Military service members and government civilians are permanent members of the Air Force, and its primary job holders. The EOD contractors are temporarily funded with overseas contingency operations funds (war funding for Iraq and Afghanistan), and when these wars conclude so will their contracts. Furthermore, in a time of budget cuts for the Air Force, the contract positions will be the first scrutinized for elimination to find savings. Losing civilian contractor EOD knowledge workers would compound the knowledge loss also felt in the loss of many of the key military knowledge workers.

The dwindling numbers of EOD Master Sergeants and Technical Sergeants, who are key knowledge workers in EOD, is creating a knowledge gap at the tactical journeyman level where true innovation and knowledge creation should be occurring. The core mission areas previously discussed are where the EOD Master Sergeants and Technical Sergeants work as team leaders and develop innovative response procedures. These are also the knowledge workers that are most proficient in the application of knowledge with respect to explosive tools.

Without their knowledge, EOD is facing a widening knowledge gap on the use of explosive tools for conventional ordnance responses, as the new crop of EOD operators have been concentrating on the present threat of IEDs. The CoP is being used to fill this knowledge gap as best as it can, but not all tacit knowledge can be codified [18]. Finally, the process of conducting EOD operations in the safest means possible is being negatively affected by reducing the avenues of knowledge transfer.

An issue is also developing in the means of knowledge transfer. The decreasing defense budget is forcing the Air Force to cut what they deem as unnecessary programs. The loss of the AFKN CoP would cut out one of the main avenues of transferring
knowledge across the EOD career field. Based on interviews, approximately 40 percent of EOD codified knowledge is transferred through use of the CoP. The remaining 60 percent is transferred through the use of emails, Air Force manuals, joint service manuals, and other written communications.

The CoP is widely used by EOD, because of the life threatening nature of the job. The AFKN CoP may not be widely used by a majority of Air Force personnel, but there is agreement in KM literature that the use of a KM or KM technology system is a poor measure of the success of the system [17]. The CoP allows EOD knowledge experts to quickly post new knowledge in the repository, and gives instant access to EOD knowledge seekers around the world. The loss of the AFKN CoP would be a major setback for the Air Force EOD community.

The effect on Air Force explosive emergency response will have far reaching implications. Loss of knowledge in any facet of explosive tool application or ordnance “render safe” procedures can cause loss of life. The Air Force EOD response capability could even be negatively impacted if action is not taken to repopulate the career field to more than 90 percent, capture knowledge before the current personnel leave, ensure the long term viability of EOD knowledge repositories (EODIMS, CoP), as well as other KM initiatives. It is important that KM in EOD is addressed before the loss of knowledge is more than the Air Force can overcome.

10. Recommendations

The first recommendation is for the EOD flights to apply the long-standing tacit knowledge continuity practice of placing government civilians in key positions. This recommendation goes a long way to solving a weakness in the current EOD KM processes with regard to retention of key knowledge workers. Incorporating continuity and expert knowledge workers by converting the current EOD contract civilians into federal government civilian positions could provide the tacit knowledge continuity required for this dangerous job. This not only has the benefit of closing the knowledge gap that is being created in EOD, but it also prevents the same issues from occurring during future conflicts. A corollary benefit is that this also helps to maintain the pool of tacit knowledge needing to be transferred to new Airmen. Fahey and Prusak [13] support the need for managing tacit knowledge and stress that organizations must understand its importance. Failing to do so can lead to failure of KM organization-wide.

The second recommendation and a strength for EOD is to continue utilizing the KM strategy of personalization, and the use of codification as a support mechanism to transfer knowledge (80/20 split). Hansen et al. [14] believe in the 80-20 split: 80 percent of their knowledge sharing that will follow one strategy (personalization or codification), and 20 percent in the other strategy as a supporting role. Despite the loss of key knowledge workers in the Master Sergeant and Technical Sergeant ranks, the master and apprentice model is still viable. An additional strength of the current EOD KM strategy is that EOD is already a high person-to-person knowledge-sharing organization, which is important for the proper execution of the personalization strategy [14]. The EOD career field thrives on innovation and autonomy, and this is the foundation of the personalization strategy. Strategies based on innovation are best supported by a personalization strategy [14]. Face-to-face meetings, training, and mentoring are the staple of EOD knowledge sharing. The codification of knowledge, and its transfer to other EOD individuals and organizations would act in a supporting role.

This leads into the final recommendation: fully funding the EOD CoP for the long term good of the career field, and the emergency response capability it provides. The EOD CoP is a strength of the current EOD KM strategy. CoPs add value to organizations in several ways: they help drive strategy, they solve problems quickly, they transfer best practices, and they help to develop professional skills [24].

Funding the CoP means that the Air Force would either need to fund the AFKN system, or transfer the EOD CoP to some other global computer exchange system. This recommendation has many options to solve the problem, but one way is to move the EOD CoP to a password protected or restricted area of the Air Force Portal. This would allow worldwide access of the CoP by the EOD knowledge workers, while allowing the Air Force to stop the funding of AFKN. Another alternative is to relocate the EOD CoP to a secure DoD-wide system so that all EOD personnel regardless of service could access and add to the CoPs knowledge repository. Some examples of information systems that operate across multiple services are the joint EOD CoP and Army Knowledge Online (AKO). These systems could provide the information protection requirements for EOD, and allow the EOD community to utilize the CoP for inter-service knowledge transfer. Jennex [16] states that KM technology systems (e.g. CoP) support knowledge creation through the methods of extraction, manipulation, codification, and visualization. Supporting knowledge creation is of
vital importance as increasing numbers of EOD Airmen leave the Air Force.

11. Conclusions

This paper discussed the issues facing KM in EOD due to the factors of retiring and transient workers. With a more mobile workforce that is being affected by deployments, family stressors, alternate employment opportunities, and a host of other issues, it is important to re-evaluate the KM effort to best plan for the future health of the organization. In order to accomplish this objective, two questions were introduced at the beginning of the paper:

1. How do we retain the knowledge that is necessary to complete this highly dangerous mission?
2. What knowledge management strategies would be best suited for Air Force EOD units?

To answer these two questions posed, this paper made three recommendations to shore up KM in the Air Force EOD field. First, it is important to place permanent federal government civilian support in each EOD unit and headquarters staff. These civilians need to be EOD qualified, and be a graduate from the Navy led joint EOD School. Second, the EOD career field needs to formally adopt the personalization KM strategy. EOD is highly innovative, and the culture is already promotes knowledge sharing. Finally, the Air Force and Civil Engineering need to find a way to permanently fund the EOD CoP. This is an important support tool for sharing knowledge across a global community.

Though knowledge-sharing practices today in EOD seem to be robust, that is not to say in the shrinking economy that the same opportunities will exist tomorrow. Simply put, every EOD operator has a wealth of tacit knowledge that needs to be shared, but with the stress and strains of multiple wars and other missions, the limiting factor becomes time. As each of these knowledgeable technicians leaves the Air Force, a wealth of knowledge walks out the door with them. The goal should be to stabilize the career field, and retain the knowledgeable EOD Airmen, and/or their knowledge, to train the future operators and save lives.

12. References


