Technology and the Technician:
## Finding the Warrant Officer's Role in the US Army's 21st Century Objective Force

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The warrant officer has occupied a unique role in the US Army over the last century. Fundamental to understanding this role is grasping what the Army looked like when the warrant officer was created and what forces were in place to allow the warrant to thrive. This analysis provides a framework for evaluating trendlines today and forecasting potentialities. The emergence of technology as a force for revolutionizing tactics and doctrine in warfare was not noted immediately at the start of the 20th Century. Entirely new weapon systems (such as the tank and airplane among others) and increased ranges and lethality of other weapons caught many senior officials off guard. In concert with this technological emergence was a realization that the US Army was not equipped to manage these new technologies. The officer corps was not interested in areas that did not offer the opportunity for advancement and command and the enlisted force at the time did not possess the education to function in this emergent world. Therefore the need for a "niche" warrior emerged. Someone was needed who had the technical prowess to operate and maintain new equipment arriving in military units. The warrant officer emerged to command and maintain tanks, pilot aviation assets and manage the increasing complexity of a diverse range of weapons systems.

This paper argues that the while the emerging Objective Force offers some striking parallels to what was seen at the turn of the last century, the "niche" is moving and the rate of this change is exponential to what was seen 20, 50 or 100 years ago. In addition, the forces that acted to create the warrant officer are fundamentally different. Therefore, the warrant officer corps must change in the face of these newly emergent technologies or risk losing its relevance.

Current Pressures

While many have said "they can never get rid of the warrant corps," this is said without grasping the radical changes that have occurred in the NCO and officer corps during the last two decades. As posited earlier, the warrant was able to thrive based on two parallel forces: unwillingness by officers to "get greasy" and the lack of educational preparation in the enlisted force. The 1980's saw a radical change in the latter as the NCO Corps professionalized its NCO education system (NCOES). The all-volunteer force was providing high school graduates who had the educational foundation to become "technically and tactically proficient." In other words, the days were fast fading when it was only "old chief" who had all the answers on that piece of equipment. The "niche" was narrowing. The 1990's saw a drawdown in the military and the officer corps in particular that deeply affected the morale of officers and had not been seen since the Reductions in Force (RIF) in the late 1970's. The Officer Professional Management System XXI (OPMS XXI) was established to offer career opportunities to non-command officers and give them a legitimate chance to progress through the ranks. Fundamental to this change was an increased specialization in many areas occupied by warrant officers and NCOs. The Functional Area (FA) designations would be a significant force acting to move the "niche."
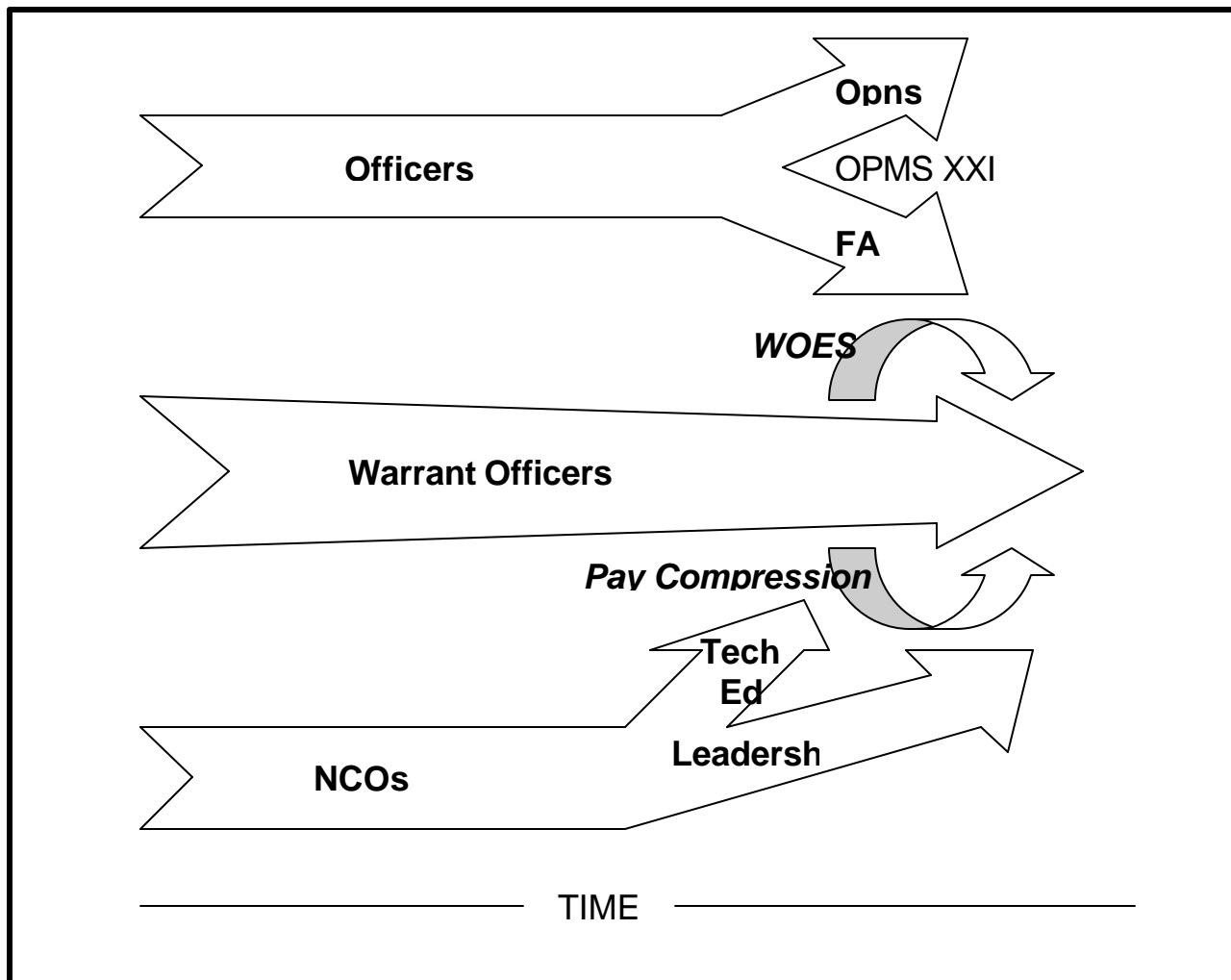
Figure 1. External Forces Acting on Warrant Officer Corps

In addition, other forces began acting on the warrant corps and other elements of the military that had never been seen. Contractors began to have increased significance all the way down to the tactical level. In theaters such as Bosnia, Kosovo and others, the contractor was seen as the technological maintainer. This new "niche" that contractors fill directly impacts the warrant officer corps. Finally internal forces within the warrant corps began to create a process of divergence within the respective career branches. While the aviation and technical divisions of the warrant corps was always operating just below the surface, the technical branches began experiencing a diversification of capabilities and assignments across the strategic, operational and tactical spectrums that placed new pressure on an already ill-prepared education system.

While the confluence of these different pressures would seem to forecast the imminent demise of the "niche" warrior, the reality is other institutional pressures and trendlines point to an increased opportunity for a "new" warrant. The overall technical competency and leadership skills of NCOES has created NCOs that are second to none, but this same professional development and promotion system has driven NCOs with visions of SFC, MSG and SGM to seek out leadership roles that in many instances move them away from daily technical competencies. It is a classic paradox; the NCO corps improved so much in civilian and military education, but had to move away from systems specialization in order to succeed in the senior ranks. This paradox aids the need for warrants. This example of a complex adaptive system

provides a framework for evaluating other trends within the military that impact the warrant officer corps.

Central to understanding complex systems (military, US Army, warrant corps, etc.), is the need for a brief explanation of trendline probabilistic modeling (Figure 2). While many cite such clichés as George Santayana's "those who cannot remember the past are condemned to repeat it." There is an inherent wisdom that points out that our actions are in many ways dictated by our past. Complex modeling points to this and allows for trendline analysis that points to likely, possible and improbable outcomes for forecasting. It is important to note, however, that what was considered improbable or unlikely half a century ago is now commonplace. An example of this is the desktop computer. Therefore, you cannot label an area as "impossible."
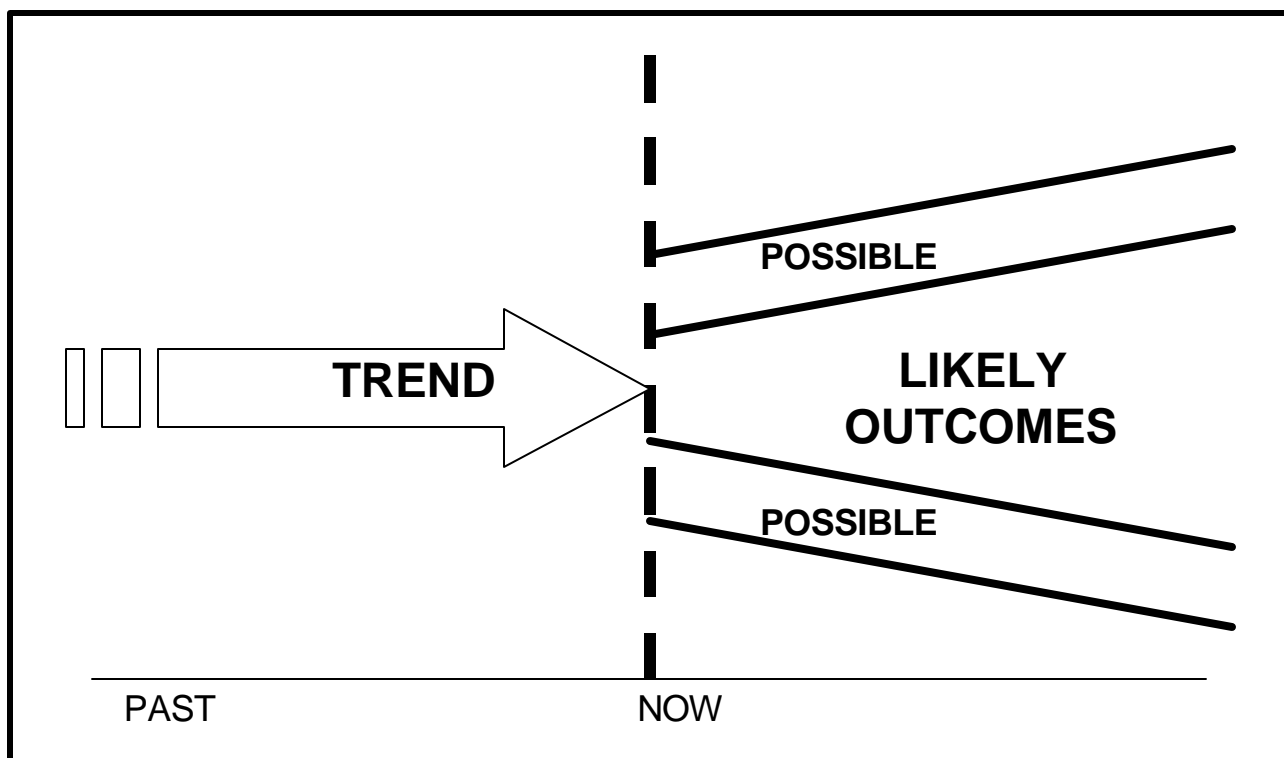
Figure 2. Trend Forecasting

Emergent Technologies

Using this model for forecasting, the next task is to examine emergent technologies and there impact on the warrant corps as a whole. The revolution in military affairs (see Joint Vision 2020) is predicated upon technology providing commanders situational awareness through vastly improved Intelligence, Surveillance and Reconnaissance (ISR).[i][1] In addition, precision fires and the compressed 4 dimensional battlespace provide US commanders the ability to engage and destroy the enemy before they are situationally aware. These new systems gain the technological edge from increased computing power, artificial intelligence (software), and miniaturization (nanotechnology). While there is an increased consilience[ii][2] (a jumping together) of these technologies that increases the rate of change, it is instead more prudent to evaluate them separately for the impact on the warrant officer corps and where the niche is moving.

Current computing power is represented in flops (floating-point operations a second). Flops speed is represented in terms of tera (trillion), peta (quadrillion) and all the way up through yotta (10^{24}). Supercomputers currently operate in the teraflop range but the ability to arrange computers in a massive parallel configuration (MPC) means that systems of computers in military units can be leveraged on the tactical net to achieve these speeds. An example of MPC is the Search for Extraterrestrial Intelligence (SETI) that uses home computers on cable modems in a massive parallel configuration to achieve teraflop speeds. But more importantly are advances in quantum and biomolecular computing that will further increase the rate of change in the computer field. As a point of comparison, scientists believe the human brain operates within a range of 100 teraflops up to 10 petaflops. These advances provide a framework for grasping what current human tasks in the military system will be handed over to computers. In addition, as speeds increase and the size of these computers decrease, the impact on manning, maintenance and the decision cycle change radically. While "techno-geek" may not be the niche that warrant officers want, the civilian sector is competing for this critical element and it is doubtful that either the officer or enlisted models offer adequate career maps for this particular technical specialist.

These changes are exponentially exasperated by advances in software and the move towards artificial intelligence (AI). AI provides a framework for systems to evaluate potentialities and decide the best course of action in milliseconds. An example would be the Future Combat System evaluating different threats and engaging each according to its priority. As tactics and doctrine emerge for the conceptual control of up to five Unmanned Aerial Vehicles (UAV) by the Comanche (RAH-66), the reliance on supercomputing and AI is self-evident. In addition, "self-healing" servers are already in the commercial market that utilizes diagnostics to identify maintenance failures and fix these errors without human intervention. The military application for this AI deeply impacts the warrant corps. While many fret at the possibility of a "Terminator" or "HAL" scenario, the reality is specialized technicians will be needed to operate and maintain this equipment. A niche that cannot be filled by high school enlistees or officers that must first focus on platoon leader time and other tactical proficiencies.

Another area that offers a new niche in weapons systems maintenance and operation is nanotechnology and miniaturization. These effects cascade across all systems. Increased lethality, precision-guided munitions, sensor depth and versatility, and smaller and more survivable systems are being driven by advances in this area. ISR in the Objective Force is dependent upon a sensor array that offers nearly complete situational awareness. Nanotechnology offers one means of achieving this awareness. Who will have the technical skills and prowess to maintain and operate this new equipment? In addition, this new maintainer is a departure from the past due to modular system of systems and block improvements of weapon systems.

Personnel Impacts

In congruence with the changes in technology and tactics, changes in the personnel system are being discussed that offer a radically different picture of a large standing army with a large enlisted force of "detail" bodies. Dr. David Chu, Under Secretary of Defense for Personnel and Readiness has talked repeatedly about not being bound to a personnel model that may not have relevance in such a fast-changing world. He said, "We recognize the need for personnel transformation that matches the physical and technological transformations we're trying to put people through which will change many policies often in ways I suspect we don't now anticipate what the effects are going to be." He cited one of the biggest challenges is "how we get people in the information technology fields who are up to speed on the latest developments…our model is we grow our own. You come in at a junior level; you serve 20-25 years." Chu emphasized this model may not work in the future and said a new example might be "agreeing to serve in uniformed capacity but the rest of the time [they're] working for Microsoft or Oracle or whoever, the cutting edge software and IT firms might be." In addition, he talked about cultural resistance based on the 17th and 18th Century models of distinctions between officer and enlisted. "Many of our enlisted personnel now have substantial college education which is one of the ways socially you still can differentiate the officer corps from the enlisted ranks because virtually every officer now has a college degree….I think we're seeing already in a variety of personnel practices, the blurring of the line in terms of who does what and what the features look like."[iii][3]

These visions of personnel transformation affect the warrant officer corps because they occur in conjunction with a Congressional Budget Office study that finds the warrant model could offer answers to attracting two-year college graduates or other technically skilled personnel. The study looked at suggestions "that the Department of Defense (DoD) might consider making greater use of the warrant officer ranks as a tool for attracting and retaining high-quality, skilled individuals, particularly in occupations with attractive civilian alternatives."[iv][4] These proposals offer a radically different vision of a warrant corps and require a fundamental change in our culture. The "grow your own" chief with 8-18 years of experience in the technical fields may not survive. While there is an institutional resistance to these ideas, the "niche" is moving.

Resistance to Change

In examining these technologies and personnel, we see massive resistance to the idea that technology will fundamentally alter the face of war. Witness the resistance to the Intermediate Brigade Combat Team (IBCT). However, a rational examination of the past two centuries shows a trend that as lethality, precision and new weapon systems increase, the need for large standing militaries decrease. Many will cite Somalia as an example of a "First Wave" (Agrarian Society) military meeting a "Fourth Wave" (Information Society) and that this proves it still takes personnel to hold ground. This evaluation is overly simplistic and fails to fully incorporate the political will and other variables that were at work in Somalia. Therefore, the new systems and doctrines that are beginning to emerge offer a great opportunity for the warrant officer.

The ability to change a sub-culture such as the warrant officer corps may not be that difficult. However, the underlying institutions that support the corps are in fundamental need of overhaul to meet these emerging technologies and trends. The Warrant Officer Education System (WOES) is not equipped or resourced to train the new officers needed for the Objective Force. The "direct appointment" or "I did it, so he should go through WOCS" arguments are both tired and dated alternatives that do not fix the institutional inequit ies between OES, NCOES and WOES. The Warrant Officer Army Training and Leader Development Panel seeks to alleviate some of these concerns by integrating and leveraging the current OES. It also provides a framework for lifelong learning for the Objective Force Warrant Officer. However, there is still near schizophrenia within the warrant corps about what direction we should travel. For instance, many argue that progressively higher rank and responsibility within the corps should result in a generalist once CW5 is attained. Others argue that this makes little sense when looking at a system that is focused on providing a narrow band of specialization. The Air Force eliminated their warrant officers due to the misperception that it was only another layer of management. In addition, the officer corps' system is geared to developing staff advisors and commanders, not the current WOES. Also, while many within the warrant corps are focused at the primarily tactical level for most of their career, many operate only at the strategic level. How do you train and equip this diverse of a corps? The answer may very well be with the individual branches, but the Warrant Officer Career Center must be the guiding light for what keeps a warrant officer distinct and in that "niche" and provide the tools necessary for a successful career.

The future is not certain and it is impossible to predict where the warrant officer may end up. The rapidity of change is daunting but there are numerous opportunities for the warra nt officer to continue holding the mysterious role as technological master (either maintainer or operator). Ultimately, we must choose to let go of some areas to find new ones where we can thrive. It is still the best job in the world.

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Endnotes

[i][1] Joint Chiefs of Staff. (2000). *Joint Vision 2020.* US Government Printing Office, Washington DC.
http://www.dtic.mil/jointvision/jv2020a.pdf

[ii][2] A term coined by Dr. Edward O. Wilson to explain the convergence of scientific knowledge. *See Consilience: The Unity of Knowledge.* 1998.

[iii][3] Interview with Dr. David Chu, DefenseLink, May 30, 2002. www.defenselink.mil

[iv][4] Congressional Budget Office. (2002). *The Warrant Officer Ranks: Adding Flexibility to Military Personnel Management.* US Government Printing Office, Washington DC.
http://www.cbo.gov/showdoc.cfm?index=3287&sequence=1