

DO MILITARY FORCES NEED PH.D.'S?

Major Ronald C Dodge, JR.

*Department of Electrical Engineering and Computer Science,
United States Military Academy, West Point, New York, 10996*

Abstract: The rate of technological advancement and the relative disparity of military power amongst many countries have fueled an oncoming revolution in warfare. To prepare to defend against the new emerging technology threats, forces must invest time and resources to develop a corps of soldiers capable of using and defending against advanced technology.

Key words: Military, Higher Education, Technological Warfare Revolution

1. INTRODUCTION

Military forces are in a state of technological transition where advances in robotics, artificial intelligence, high performance computing, and communications are setting the stage for a potential revolution in the conduct of war. Some might argue that the revolution has begun. Developing core competencies in the areas of information technology in the military services is critical to the establishment of policies and procedures to usher in new paradigms in warfare. This is increasingly important as rapidly advancing technologies are fueling the deployment of force multiplying tools without clear policy or soldier training. A revolution in warfare is described as¹:

1 Tom McKendree, The Revolution in Military Affairs—Issues, Trends, and Questions for the Future, paper presented at 64th MORS Conference, Fort Leavenworth, Kansas, June 1996

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“a military technical revolution combining [technical advances in] surveillance, C3I [command, control, communications, and intelligence] and precision munitions [with new] operational concepts, including information warfare, continuous and rapid joint operations (faster than the adversary), and holding the entire theater at risk (i.e., no sanctuary for the enemy, even deep in his own battlespace).”

The existence of a cyber threat is now universally accepted. Clearly the conditions exist for a new pattern in war fighting and military forces must leverage the new technologies or become a victim of their use. Potential actors include hackers, hactivists, industrial spies, organized crime groups, terrorists and national governments. The most serious threat comes from nation states. The PLA Daily reported in January 2003² that the Chinese government was taking “new steps in the Air Force Engineering University to train high-quality military talents targeting on the academic leading edge. “ Additionally, development of a Chinese “Cyber Corps” has been reported as early as 2001. Other countries have responded to this threat: Taiwan established an Information Warfare force, in 2001, to counter potential Chinese cyber-attacks.³ The force will eventually be about battalion sized and be independent of any military service.⁴ The South Korean government is planning on establishing specialist units for cyber warfare.⁵ The Japanese Defense Agency is also rumored to be establishing a cyber-warfare organization.

The need for a growing and evolving knowledge base in information security as part of the transition to technological warfare should be clear, as well as the need to continue to engage in understanding and developing new technologies. To affect the leveraging of these emerging technologies, members of the military must understand the technologies and be directly involved in the research and development process.

² Ren Peilin and Meng Feng
http://english.pladaily.com.cn/english/pladaily/2004/01/06/20040106001028_ChinaMilitaryNews.html, January 6, PLA Daily

³ Jane’s Defence, Jane’s Sentinel Security Assessment, Armed Forces – Taiwan, 9 April 2002.

⁴ Jane’s Defence, Jane’s Sentinel Security Assessment, China and Northeast Asia, 8 March 2001.

⁵ Jane’s Defence, Jane’s Sentinel Security Assessment, China and Northeast Asia, 9 April 2002.

2. EXISTING DEPARTMENT OF DEFENSE SUPPORTED PHD PROGRAMS

The United States Military has long recognized the necessity to have service members educated and involved in the various technologies being employed. Currently the services have thousands of soldiers enrolled in advanced degree programs for the purpose of bringing technology back to the individual service. The programs attended by the soldiers have no definitive restriction on where the advanced degree it attained. Currently, Department of Defense personnel attend programs from United States public and private colleges and universities to programs in foreign countries. The diversity, both in focus and location of the programs attended by soldiers is critically important to the continued growth of not only academically qualified but also culturally diverse educated soldiers. A brief history of the quest for educated soldiers in the United States is⁶:

- 1802 – President Thomas Jefferson signed legislation authorizing the creation of the United States military Academy, the first engineering school in the United States
- 19th century – Most large engineering projects completed in the United States benefited directly from the involvement of West point graduates.
- 1925 – The Army sent Jimmy Doolittle to the Massachusetts Institute of Technology to earn a doctorate in aeronautical engineering.
- WWII – Numerous scientists in uniform served the nation and the Army.
- 1947 – MAJ GEN Henry S Aurand, director of research and development, general staff at the war department, tried to create a corps of scientist-officers.
- 1984 – Lt. Gen. Maxwell Thurman, Army deputy chief of staff for Personnel, directed the establishment of the Army's Technology Enhancement Program (TEP); sending officers to masters and doctoral programs.
- 1985 – Brig Gen. Hines, deputy commanding General of the Army Personnel Command, created a new officer branch to manage officers in the TEP – the Science and Technology Corps.
- 1990 – Gen William Tuttle, commanding General of the Army Material Command, offered 140 positions for a Uniformed Army Scientist program.

⁶ Barry Shoop and Kenneth Alford, Army Transformation: Uniformed Army Scientists and Engineers Dec 2002 Issue Cross talk , the Journal of defense software engineering

- 2002 – Gen Eric Shinseki, Army Chief of Staff, approved in principle the establishment of a formal Uniformed Army Scientist program.
- 2004 – First officers selected for the Uniformed Army Scientist program.

In 1996, a report issued by the Army Science Board stated⁷

“... the Army’s reliance on modern weapon systems and technology has been growing, its cadre of technology- literate line officers and science, math, and engineering (SM&E)-educated officers has been reduced. “ Six years later in 2002, the formal Uniformed Army Scientist program was defined to address this shortfall.

Focusing more specifically on information assurance, the United States Department of Defense has established an Information Assurance Scholarship Program. This program consists of three Department of Defense Centers of Academic Excellence in Information Assurance that sponsors graduate programs in information assurance. These three institutions are the Information Resources Management College (IRMC) of the National Defense University (NDU), the Naval Postgraduate School (NPS), and the Air Force Institute of Technology (AFIT). Partner schools include: George Mason University, James Madison University, Mississippi State University, Syracuse University, University of Dallas, University of Maryland Baltimore County, University of Maryland University College, University of North Carolina Charlotte, and the University of Tulsa.

3. MILITARY NEEDS

The needs of the Department of Defense differ in some important ways from other market sectors. The non-Department of Defense markets receiving students graduating with advanced degrees tend to pick the most qualified from the set of graduates. If a student does not complete the program nor does anything to set him or her apart from the other graduates, the only loss is to the student. In Department of Defense programs, officers typically will return to the service regardless of their performance in the degree program. Additionally, in the past, the pursuit of advanced degrees has not been seen as a promotion enhancing activity. This greatly reduced

⁷ U.S. Army. “The Science and Engineering Requirements for Military Officers and Civilian Personnel in the High Tech Army of Today and Tomorrow.” Army Science Board Study, Feb. 1996

the set of qualified officers seeking to enroll in masters or doctoral programs.

3.1 Unique Need for Rapid Return to the Force

The framework for programs designed to support the Department of Defense need to focus on a seemingly competing set of goals; the need to produce highly educated officers, skilled in information assurance and the need to have those highly educated officers out of degree programs as rapidly as possible to ensure maximum productivity while in the service. A normal career in the United States military is 20 years. Currently officers are not identified for a doctoral degree program until he or she has been in the service for ten or twelve years. Even at that point several must still complete a masters program. This places the service and the soldier in difficult situation if there are any delays in completing the academic program.

3.2 Skill Sets

Another area that differs from other markets is the focus on a more hands on experience in the designated domain. As indicated previously, the longevity of many officers after completing a doctoral program is somewhat limited. The ability for an officer to learn the necessary skills in a specific domain is crucial to the ability of the officer to contribute.

The skill sets attained while in pursuit of a doctoral degree are most beneficial when they are tied to a specific problem that the officer will tend to when leaving the school environment. This is difficult to implement in practice given the widely varying interests and foci of sponsoring faculty at the different degree granting institutions and the classification level of some research.

3.3 Advantages To A Multi-University / Multinational Program

The mission of the armed forces for the United States is entirely outward focused. In fact, the United States constitution has specific clauses prohibiting the use of active duty members of the armed services from operating (other than training) in the United States. This presents the Department of Defense with a unique goal of producing culturally diverse officers capable of interfacing with other nationalities. One might argue that a service member with a doctoral degree would no longer be considered in the collection of officers with an outward focus, however at the most basic

level, every soldier regardless of specialty must be able to function in the basic mission. A program designed to place the officer in programs in countries other than the United States is the most direct way of achieving this diversity and understanding while at the same time moving toward our educational goal.

A second advantage to service members completing all or part of their degree in an institution outside the United States is the different academic foci. As more collaboration is conducted amongst geographically close schools, the research content and methodology of the institutions naturally begins to homogenize. Much like the cultural diversity goal of the Department of Defense, a diverse approach to formulating and solving problems should be a heavily weighted consideration.

3.4 Disadvantages To A Multi-University / Multinational Program

The primary disadvantage to conducting a multi-institution program of study is the coordination of research goals and practices. As important as it is for the Department of Defense to have diverse officers, the integration of differing processes, which can in some cases be fundamental in nature, make collaboration difficult, if not impossible. Additionally we must consider the goal of conducting directly relevant research and the timely completion of the doctoral research.

The nature of Department of Defense sponsored research adds a further layer of complexity to research area development where security classifications are a problem. This however can be mitigated and does not present an insurmountable hurdle.

The third area of concern is the time it takes to complete the program. Like the research process, inserting disruption in the dissertation process has the potential of disrupting the successful completion of the research. An officer typically must complete a masters program in two years and a Ph.D. in three years. If not complete in the three year window, the officer may continue the dissertation for an additional two years, but must do so in addition to normal military duty. Completing a Ph.D. under the umbrella of a two year extension is very difficult and the challenge is compounded as travel to the institution (New York to Sydney for example) adds complexity.

4. CONCLUSION

The goals of a Military PhD program must be formulated with the focus of advancing the ability for the service to fight and win wars. Today, the

militaries of the world are on the verge of a revolution in waging war. The advancement of technology will impact the way we fight on many fronts. As an example, depending on the sophistication of the enemy, significant disruption, aimed at an enemy's center of gravity, can be attained through cyber attacks. The ability of a force to capitalize on technological advances before an enemy will be a defining factor in victory. In the late 1800's, Sir William Francis Butler, withstanding the specific technology, recognized the necessity of education:

“The nation that will insist on drawing a broad line of demarcation between its fighting man and the thinking man is liable to have its fighting done by fools and its thinking done by cowards.”

The Department of Defense goals of diversity, timely completion, and rapidly transferable experience need to be balanced with establishing a productive framework within which a successful doctoral program can be completed.