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Selective Service Hearing: How to Meet Potential National Mobilization Needs

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Chairman Heck and distinguished members of the Commission, thank you for having me today. It is an honor to be included in this conversation. My name is Dr. Jackie Schneider. I am an Assistant Professor at the Naval War College and a core faculty member of the Cyber and Innovation Policy Institute at NWC. My work looks at the intersection of technology, national security, and political psychology including research on cyber strategy and cyber talent. I am also an Air Force reservist at U.S. Cyber Command. My comments today represent my own views and do not represent those of the Naval War College, U.S. Navy, Cyber Command, or the Department of Defense.

I was asked today to speak about the skills and capabilities of the future armed force and discuss the gaps in the force as well as potential solutions as we move forward. Central to this discussion is a conceptualization of what war looks like both in the near and long term future. Too often our discussions of future warfare either draw on analogies of the past or take on a sci-fi quality, leaving us with the false choice of humanoid robots or GI Joe. This schism represents more than a failure of imagination and instead illustrates the strong divide that exists between how we think about technology and how we think about people in war. The truth is that these things are not separate and more than ever technology and human beings are intertwined in war and competition. Fighter pilots now spend more time strategizing data link integration than how to employ guns in a dogfight. Special operations forces rely on satellite relays and real time technical intelligence to conduct remote operations. Sailors must be as competent in compass use as interpreting radar returns.

Further, the algorithms of warfare—the way in which an active seeker head finds its target, the means by which air defenses parse information about target locations, the machine logic by which we coordinate unmanned and manned vehicles to conduct paired operations—are quickly becoming the criteria by which states win and lose in war. The ability to collect, parse, and act on data is key to any military's success. The arms race of today—both for winning competition and war—is not about technology. It is about technologists.

If the key to winning competition and conflict is technologists, then is the United States military prepared? What are the skills and capabilities we need in the armed forces and do we have them already? How will we recruit, retain, and train? What are the organizational, technological, and cultural barriers that impact our ability to field the future force? Finally, what can we do to overcome them?

What do we need?

The 2018 National Security Strategy and National Defense Strategy proclaim the resurgence of great power politics and long term competition with rising peers in China and Russia. Central to victory for both competition and conflict within these strategies is the United States' ability to compete economically while deterring conflict and, if necessary, winning in short and decisive military engagements. Technology plays a central role in these strategies—in ensuring economic prosperity, in protecting freedom of speech and democratic governance, in safeguarding a free and open internet, in ensuring situational awareness of adversary capabilities, in providing long-range and precise military strike capabilities, and in coordinating joint forces across the globe.

The armed force of great power competition and conflict must be both poised to defend the United States against day to day cyber and influence operations while at the same time honing its conventional and nuclear military power to deter adversary aggression. In order to do this, the U.S. needs a force that can innovate and experiment with technologies, implement new technologies in operations, and perhaps most importantly maintain and function without technology. Whereas the mechanization revolution created a whole new class of military professionals trained to maintain and utilize technology like the tank or the airplane, today's warfare requires a class of military professionals that can safeguard, collect, store, process, transmit, use, and restore data. Instead of machinery technicians, future warfare calls for data scientists, network engineers, cloud security specialists, satellite communications engineers, machine learning scientists, robotics engineers, computer programmers, ux engineers, and devop and system development engineers.

These emerging technological missions will happen in conjunction with many of the bread and butter mission sets of today's military—launching missiles, providing air defense, patrolling zones, conducting ground maneuvers, transiting oceans, and providing nuclear deterrence. Consequently, the force of future warfare will include data scientists and infantry officers, programmers and fighter pilots, graphic designers and logisticians, webmasters and special operations units. Technologists in this force will be located at research and lab centers in the United States, embedded in combat units deployed and at home, and within reserve and guard units focused on defending the nation against asymmetric threats. In addition, technological skills will become necessary capabilities for other core combat specialties as the force of today becomes trained and prepared for the conflicts of tomorrow.

Are we prepared?

If technologists are key to winning great power competition and conflict, then how is the U.S. fairing? The answer is that it is difficult to know. First, the U.S. has only begun to understand what technological skill sets it needs and is still largely unable to quantify what talent it currently has or how the talent it has stacks up to civilian (much less adversary) talent. Second, in the skill sets that we do closely monitor, we have identified significant recruitment problems. For example, the Air Force continues to forecast a large pilot deficitⁱ and all of the armed services are struggling to recruit, train, and retain cybersecurity professionals. Finally, the DoD has outsourced much of its technological talent to defense industrial base contractors as well as a handful of technology companies. While this provides a valuable stopgap for

technological talent deficits, it sidesteps important questions about the role of technologists in the combat forces.

Part of the problem facing the military is that there is a small pool of qualified or top candidates to fill the technological gap. Perhaps most significantly, the military is not the only one searching for this talent. In cybersecurity, for example, a 2018 study conducted by (ISC)² identified a cybersecurity labor gap of almost 500,000 professionals.ⁱⁱ At the same time, civilian job openings in artificial intelligence have doubled in the past year, with little change in the amount of qualified individuals coming out of universities. Competition between major technology firms for these top cybersecurity, machine learning, data scientists, and software developers is so fierce that salaries and benefits have skyrocketed. And the competition for talent goes beyond Silicon Valley. Pilots are also increasingly in demand, with civilian and cargo airlines seeking to replace their aging workforce with a shrinking supply of new commercial pilots.ⁱⁱⁱ

The competition with civilian companies becomes even more difficult because the military must pull from a smaller pool than top civilian companies. Military personnel must meet physiological requirements—whether that be passing physical fitness tests or baseline health assessments. Top technologists with asthma, some dental implants, IBS, or problems with pronation may not be medically qualified to serve in the armed forces. Further, many of the technology missions are considered highly sensitive, which means that qualified candidates must have limited drug use, and be willing to report all foreign travel and connections (something which can be laborious and creates huge career impediments for some fields dominated by foreign researchers and workers).

Recruiting and retaining this small pool of talent is an uphill battle for the DoD. It's easy to blame this uphill battle on pay, but surveys suggest that many of these top technologists are willing to sacrifice compensation for work satisfaction. And while the DoD can offer a meaningful mission and often opportunities to work on technologies not accessible in the civilian realm, the DoD has a long way to go to create a satisfying work environment. Service members often invest 10-12 hours a day on their mission and are asked to take extended temporary duties and remote deployments. But on top of these mission requirements in which service members excel, they are also asked to deal with unwieldy administration including an overly complicated defense travel system, human resources applications that are often inaccessible from standard internet browsers, defense websites incompatible with non-PCs, and time-consuming computer based training that functions more as a risk-mitigator than a skill enhancer. Additionally, the accessions and promotion system struggles with non-traditional candidates and provides little flexibility for career progression—a major incentive for recruiting younger candidates. Related, the traditional military family life which calls on military members and their families to move stations every one to three years poses significant challenges for dual career couples which are a prominent constituency within the high technology talent sample. And, unlike many of the top technology firms that have prioritized family services, the DoD does not have available high quality child care at all military installations (and especially not during the extended hours of many duty days).

Solutions

Despite the uphill battle to compete for top technology talent, the DoD can make cultural, organizational, and technological changes that will allow the U.S. to win in competition and conflict.

Cultural Solutions: The military needs to evaluate their standards for grooming and physical fitness, especially what requirements are necessary for the warrior of the future. Technologists embedded within combat units may need to follow the same physical standards as other combat specialties, but others further away from the line of fire may be top contributors even with poor fitness scores. Secondly, the DoD should build on initial moves to provide creative career progression opportunities, including fellowships in the civilian sector, normalized transitions between the reserves or guard and active duty, or sabbatical periods. Finally, the DoD may have to evaluate its processes for obtaining and maintaining security clearances. The process needs to be streamlined. It is not acceptable for prospective candidates to await clearances for 12-18 months. Additionally, some of the top talent will also have high risk relationships with foreign companies or technologists, an externality of their industry. This should not be a dealbreaker for bringing in talent.

Organizational Solutions: The military has already started a series of initiatives aimed at streamlining hiring for cybersecurity professionals, testing for technological skillsets, identifying programming capabilities, and investing in scholarships and reskilling academies. These initial initiatives are strong first steps but have yet to show significant progress in closing the technological talent gap. Without complementary changes in promotion structures, any steps towards recruitment might not solve retention in the long term. Additional focus on providing certifications, unique training on emerging technologies, and opportunities to employ or experiment with innovative technologies can help with retention. However, difficulties retaining talent could be mitigated by distributing technological capability within forces that already have high retention rates. Retraining capable service members can decrease accession lags while also investing in members that have already assimilated into military culture. Further, providing technological training to combat units and to other combat specialties may provide technological capabilities with less investments in new personnel.

The Reserves and Guard also provide a potential organizational solution to the search for technologists. Because these forces are often employed in the civilian sector, they benefit from cutting edge training and experience. The Reserves and Guard also provide a non-traditional option for technologists looking to serve their country without active duty obligations. Despite the promise of the reserve and guard force, there are significant caveats about using the reserve and guard as the primary solution to a technological talent gap in the active duty. Over the last fifteen years, the reserve and guard force has become more like the active duty, deploying in place of active duty units, and prioritizing the growth of full time reserve and guard personnel. While that has solved many of the difficulties of fighting multiple wars with an all volunteer active duty force, it has also made the reserve and guard less useful as an outlet to attract non-traditional talent. Additionally, because the reserve and guard forces have not heavily invested in innovative information technology, part-time reservists and guard members spend a disproportionate amount of their time trying to navigate unwieldy trainings, human resources applications, and travel and orders websites. For those who take a significant pay cut from their

civilian job to participate in drills and annual training, it may be a difficult sacrifice to spend their time on non-mission work like cyber awareness training or on filing vouchers. Finally, many reserve units struggle to gainfully employ their part time technologists and instead promote multiple month orders. Highly successful talent is less likely to opt for these long term order situations and therefore are underemployed as part time reserve or guard members.

Technological Solutions. Many of the challenges faced by the active duty, reserve and guard forces can be solved with investment in better IT, especially IT that streamlines personnel actions, travel, and training. So far, the DoD has not prioritized technological solutions for administration and instead has chosen to spend labor time—a fixed cost for active duty forces—to manhandle cumbersome administration requirements. If the DoD wants to retain top talent—across capabilities and skills—it must see investment in IT admin as high a priority as new missiles or radars. Further, investment in IT for human resources can create databases of special skills, align those skills with appropriate jobs, and track successes and problems in talent recruitment, use, and retention.

Concluding Thoughts

The force of tomorrow is a force of technologists, of front line operators who understand the algorithms that undergird their weapons, technologist embedded within combat units, and researchers and developers experimenting with new technology at all levels of competition and conflict. And, while it won't be easy to recruit, retain, or train the future armed forces, there are innovative solutions to winning the technologist arms race. The first step is identifying the skills and missions that the armed forces need for future competition and reappportion the forces to reflect a move from the mechanization to information revolution. The armed forces must also recognize the changing culture they are in and foster career flexibility, on and off ramps, and support for military families. Above all, the military must prioritize people and be willing to make cultural and organizational changes while investing in IT and processes that show the force that their service is valued.

ⁱ <https://www.businessinsider.com/air-forces-quiet-crisis-creating-pilot-and-manpower-shortage-2017-8>

ⁱⁱ <https://www.isc2.org/-/media/ISC2/Research/2018-ISC2-Cybersecurity-Workforce-Study.ashx?la=en&hash=4E09681D0FB51698D9BA6BF13EEABFA48BD17DB0>

ⁱⁱⁱ <https://www.forbes.com/sites/marisagarcia/2018/07/27/a-perfect-storm-pilot-shortage-threatens-global-aviation-even-private-jets/#4ff30fe15492>