

Improving on Success



Expanding the Use of Prime Contractors for Soldier Clothing and Equipment

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Executive Summary

The individual soldier is the U.S. Army's most important and frequently deployed asset. As such it is imperative that the soldier be provided the best clothing and individual equipment. The right clothing is a combat multiplier because it allows U.S. soldiers to operate under conditions that the enemy cannot. When U.S. soldiers deployed to Afghanistan after September 11, 2001 they were confronted by extremes of terrain, altitude, temperature and weather. The lack of infrastructure required extensive dismounted operations, often at high altitudes and in poor weather. U.S. soldiers lacked the appropriate clothing to operate effectively in extremely cold weather and harsh terrain.

The Pentagon was faced with the enormous task of providing the entire Active Component and mobilized reservists with the clothing and individual equipment with which to conduct intensive and protracted operations. This challenge was made all the greater because in many cases the desired clothing and equipment was only available from non-defense commercial vendors. Timing was also a factor. When the Army decided to change the uniform camouflage pattern for forces going to Afghanistan it wanted the first uniforms available in just a few months.

PEO Soldier chose an innovative and, in the view of some, risky, approach. It selected a private sector prime contractor to provide the entire military with the third generation or GEN III Extended Cold Weather Clothing System (ECWCS). This company procured the GEN III ECWCS components, managed the supply chain and ensured that the required number of complete kits were shipped in time to deploying units. The GEN III ECWCS prime contractor successfully managed more than a dozen subcontractors while overseeing the delivery of some 1.8 million sets of clothing.

The prime contractor model was so successful that PEO Soldier used this approach for acquisition of another clothing system, the Fire Resistant Environmental Ensemble (FREE) and for the Modular Sleep System (MSS). By adopting this innovative contracting approach PEO Soldier was able, radically and rapidly, to improve the capabilities available to soldiers in Iraq and Afghanistan. Equally important, the prime contractor model saved money.

The Department of Defense needs to capitalize on the private sector's record of success in procurement and supply chain management. Even as the conflicts in Iraq and Afghanistan wind down, the department should expand the use of this approach as far as is practical. This would ensure a basic supply chain for advanced textiles and clothing items. Also, it would allow for continuation of direct vendor deliveries, save money on warehousing and third-party logistics and enable ongoing improvement/ innovation of parts.

The same contracting model developed for the GEN III and FREE clothing systems could be applied to other soldier subsystems, such as body armor, load carrying systems, helmets, boots and individual communications equipment. In addition, the Defense Logistics Agency Troop Support should leverage industry strengths in supply chain and inventory management when determining which items they will procure/receive/stock/issue and which are better managed by a prime contractor.

The Right Clothing and Equipment is a Force Multiplier

During Operation Mountain Lion I found myself praying for bad weather, the first time in my military career I was actually begging for a cold front to come through. I knew my Soldiers could handle it and the enemy couldn't. ECWCS allowed my men to outlast the enemy on their own terrain. When the enemy was forced out of the mountains due to the bitter cold to take shelter, that's when we got them.

*Lieutenant Colonel Christopher Cavoli
U.S. Army 10th Mountain Division
Afghanistan, 2007*

There is an old proverb that starts “for want of a nail” and ends first with the battle and then the kingdom being lost. It suggests that small, seemingly insignificant changes in initial conditions can have big consequences. This statement is particularly true when it comes to combat. However, the obverse of this proverb is also correct, at least when it comes to combat. A relatively simple capability can confer on one side a significant, even decisive, military advantage.

There is no better example of this than the right cold weather clothing. A lack of appropriate clothing for the Russian winter was an important contributing factor to the Wehrmacht's failed offensive in 1941. During the retreat from the Chosin Reservoir in the winter of 1951 following China's intervention in the Korean War, U.S. Marines suffered particularly high rates of cold weather injuries; their opponent, the People's Liberation Army, provided its soldiers with the appropriate winter clothing. When Moscow invaded Afghanistan, Russian soldiers discovered that their standard issue uniform, designed for the European theater, was inadequate to the challenges of that country's weather. The lack of appropriate cold weather clothing limited the ability of Soviet forces to conduct winter operations. The previous times U.S. troops were in winter combat, during World War II and in Korea, 10 percent of all casualties were related to cold weather.

Afghanistan confronts all combatants with extremes of terrain, altitude, temperature and weather. Both U.S. forces and Taliban fighters must endure exhausting heat during the day in lower altitudes and freezing temperatures at night in higher altitudes. In winter, the combination of very low temperatures, heavy snowfalls, high winds and thinner air in the mountains present a significant maneuver challenge, particularly for dismounted forces. These conditions also increase the risk for a range of illnesses including hypothermia, frostbite, dehydration, trench foot and, surprisingly, sunburn.

For U.S. forces in Afghanistan the physical challenges associated with terrain and weather are compounded by the weight of all the equipment that must be carried when dismounted. The combination of heavy loads, high altitudes and extremes of temperature can cause clothing to become saturated with perspiration as well as rapidly exhaust even the fittest soldiers and marines.

In Afghanistan, not only can the right clothing make the difference between health and illness but also between winning and losing the tactical fight. Special Operations Forces have a long history of using inclement weather to achieve surprise. In modern counterinsurgency operations, all U.S. combat forces must be able to do the same. As the citation from Lieutenant Colonel Cavoli makes clear, with the proper cold weather clothing U.S. forces can remain in the field while their adversaries are essentially immobilized. This can be an enormous tactical advantage.

More broadly, the ability to continue operations during harsh weather in Afghanistan has provided coalition forces with a potentially important operational advantage. Over the past several years coalition forces have shifted from a cyclical kinetic campaign based on a set “fighting season” to a continuous year-long effort. As Taliban fighters are forced by the harsh environment to seek shelter, properly equipped coalition forces have continued to conduct critical operations. The only alternative for the Taliban is to remain in the open even as the weather turns harsh and temperatures plummet, thereby risking injury, disablement and even death.

Much attention has been devoted to the positive impact on U.S. operations in Afghanistan of specially designed armored vehicles and unmanned aerial systems. Largely unrecognized, but of equal importance has been equipping the individual soldier and marine with the right clothing and equipment.

Getting the Right Stuff to the Right People at the Right Time

The conflict in Afghanistan posed many significant challenges to U.S. forces. One of the most serious of these was that country’s extremely difficult physical environment consisting of high mountains, extreme winter cold, severe heat, high winds and dust storms. The lack of infrastructure, dispersal of much of the population in small villages and the presence of long-standing and well-developed Taliban hideouts frequently required U.S. forces to operate dismounted. The mission of searching out and defeating Al Qaeda and the Taliban, particularly when it took place at higher altitudes, required different, more flexible and lighter weight clothing, equipment and even weapons than what had been provided to Army units.



The peacetime military had not paid adequate attention to modernizing soldier clothing and equipment, even as the equivalent commercially-available items underwent revolutionary improvements. Some clothing and equipment items had not changed since the 1950s. In other

instances, new items had been developed by the U.S. Army Natick Soldier Research, Development and Engineering (RD&E) Center but not acquired at the time the conflict began.

Almost from the moment that U.S. forces deployed to Afghanistan reports came back of equipment shortages and items that were not adequate to the environment. Initially, the Army was poorly postured to address these problems. Units, individual soldiers and even families resorted to buying commercially available items using personal funds. There were cases in which Special Operations Forces (SOF) in-country called back to commercial vendors of sports clothing in the United States to acquire appropriate cold weather clothing which then was shipped via commercial air carriers to Afghanistan.

Confronted by a torrent of criticisms regarding inadequate and insufficient equipment, then-Army Chief of Staff, General Peter Schoomaker responded swiftly by directing Program Executive Office (PEO) Soldier to address the urgent requirements for appropriate capabilities. PEO Soldier, in turn, created the Rapid Fielding Initiative (RFI) in 2002. Initially, the goal of the RFI was to streamline the process for distributing equipment to those units about to be deployed. It soon expanded to ensure that all soldiers—regular Army, Guard, and Reserve—deploying were outfitted with the most advanced individual and unit equipment available, providing significant improvements to soldier combat effectiveness, survivability, and operational quality of life. Through the RFI system, PEO Soldier has equipped nearly 1.5 million deploying soldiers.¹

Over the past nine years, PEO Soldier has achieved an enviable record of success in rapidly fielding a wide variety of items including boots, helmets, body armor, laser rangefinders, individual weapons, night vision systems and clothing. Some of these items were commercial-off-the-shelf. Increasingly, the items provided through RFI were modified or improved versions of what had originally been commercial products. Responding to information from the field, particularly the views of the soldiers who must use the clothing and equipment, and rapid experimentation, the RFI develops modified or even new capabilities that can be introduced into the force. In a number of cases, items have gone through several iterations before an entirely satisfactory solution has been found.

ECWCS: A Case Study in Technological Revolution

An example of how PEO Soldier successfully implemented its mission is the effort to supply the forces in Afghanistan with appropriate cold weather gear. The problem confronting PEO Soldier was the need to provide the warfighter not simply with an overcoat or gloves but a “system” of clothing that would support U.S. forces in the field, at their bases and in vehicles. This system had to accommodate weather and temperature changes. Somewhat ironically, it also had to prevent overheating and protect the wearer from the effects of perspiration. Given the diversity in height, weight and body type, any clothing system would have to be provided in multiple sizes.

¹ Program Executive Office Soldier, at <https://peosoldier.army.mil/newpeo/AboutUs/RFI.asp>

The solution involved creating a revolutionary cold weather clothing system. Based on the work of the Natick Soldier RD&E Center, PEO Soldier introduced the third generation cold weather system called GEN III Extended Cold Weather Clothing System (ECWCS). The 12 components of the GEN III ECWCS include a lightweight undershirt and drawers, midweight shirt and drawers, fleece cold weather jacket, wind/ cold weather jacket, soft shell jacket and trousers, extreme cold/ wet weather jacket and trousers, and extreme cold weather parka and trousers.



Unlike GEN I and II, each of the 12 components of GEN III was designed to work as part of a system intended to exploit the effects of insulation, layering and ventilation. Soldiers were able to vary the number of layers worn to maintain comfort and improve their ability to perform specific missions. A soldier from the 10th Mountain Division which tested the GEN III during its 2006-2007 rotation described the new system's benefits thusly, "It was a very good system because it gave us different layers to be able to change with the environment as opposed to just throwing on an overcoat regardless of how cold it was."²

GEN III's design illustrates the importance of continuous technological innovation in the fields of soldier clothing and individual equipment. The system features seven new layers of insulation including three which employ Polartec fabrics. GEN III also incorporates design changes based on feedback from the field regarding the buildup of moisture on the body and the bulkiness of the GEN II system, and has improved moisture control features. GEN III is both lighter and less bulky than its predecessors while offering improved thermal protection. Additional features include Near Infrared Textile Technology to reduce vulnerability to night vision equipment and integration with the Modular Lightweight Load-carrying Equipment system and body armor.

The Prime Contractor Model: A Revolution in Delivering Capability to the Warfighter

Over the past decade, as the conflicts in Iraq and Afghanistan intensified, the military faced the problem of responding to urgent operational needs statements flooding back from the field. The Department of Defense (DoD) turned to the defense industry, employing unique contracting mechanisms that enabled prime contractors to bypass the slow and cumbersome acquisition system and rapidly design, integrate and produce dozens, hundreds and even tens of thousands of new systems, kits and capabilities.

² Generation III Extended Cold Weather Clothing System (ECWCS), Fact Sheet, PEO Soldier, May 2009

One example of the innovative empowerment of prime contractors was in the Mine Resistant, Ambush Protected (MRAP) and MRAP-All Terrain Vehicle (M-ATV) programs. Then-Secretary of Defense Robert Gates declared the MRAP program to be DoD's "highest priority" and set a



goal of getting as many of these to the soldiers and marines as rapidly as possible. This task fell to five prime vendors, General Dynamics, BAE Systems, Navistar, Oshkosh and Force Protection. As well as designing, producing and testing the vehicles, the prime contractors had to create from scratch and then manage new supply chains involving as many as 62 Tier 2 vendors for 15 critical subassemblies and also support maintenance and repair. Ultimately, the program built more than 27,000 vehicles.

Another example is the MC-12 Liberty, a manned, aerial, real-time intelligence system. The aircraft are military versions of the Hawker Beechcraft Super King Air 350 and Super King 350ER. A fully operational system consists of a modified aircraft with sensors, a ground exploitation cell, line-of-sight and satellite communications datalinks, along with a voice communications suite. On July 1, 2008, the Secretary of Defense tasked the Air Force to acquire 37 MC-12 Liberty's; nine months later, the prime contractor, L-3 Communications, delivered the first aircraft in theater.

PEO Soldier faced the challenge of managing the procurement of hundreds of thousands of GEN III ECWCS clothing sets with 12 components in 15 different sizes, their integration into complete sets and the delivery of the quantities needed to units prior to their deployment. The customary acquisition process involved letting individual contracts for each item, or in some instances for the basic fabrics and materials to manufacture an item. All items were delivered to a government facility for integration prior to shipment to the receiving unit. Were new or even modified components to be included in the system or a new vendor included in the supply chain, new contracts would have to be created.

Following the example set by DoD in programs such as the MRAP and the MC-12 Liberty, PEO Soldier created the first prime contractor for soldier clothing. Instead of attempting to manage the array of commercial clothing fabric and component providers and the extensive supply chain supporting ECWCS, PEO Soldier created a competitive contract for a private sector company to procure GEN III ECWCS components, manage the supply chain and insure that the required number of complete kits was shipped in time to deploying units.

Why take the then unusual step of creating a prime contractor for the GEN III? PEO Soldier recognized that the acquisition of specialized clothing such as the GEN III system needed to consider the integration of all soldier equipment. This reflected the fact that soldier clothing was becoming a complex and technologically-sophisticated system. In addition, the dispersed and

diverse character of the U.S. commercial fabric and clothing industry made the traditional multi-contract approach much more difficult for the government to oversee and manage.

A prime contractor can provide additional advantages compared to the traditional acquisition model.

- PEO Soldier only has to issue one contract and one set of delivery orders. The prime contractor completes the contract review process across an entire supply chain, consolidates any issues and insures the contract team's ability to execute orders and implement any changes across the full supply chain.
- Because the government has only a single contract, the acquisition process can be more responsive. As a result, changes can be made with respect to quantities, timing and even technical characteristics of the product faster on the commercial side and surges can be structured to meet operational tempo.
- The prime contractor can stabilize the flow of materials and parts and ensure timely delivery of products. The prime contractor not only does demand forecasting but also is able to sequence the work flow across the entire supply chain.
- The prime contractor can be responsible for consolidating individual components into full kits or systems and for ensuring their delivery. To accomplish this goal, the prime contractor manages and monitors the production flow at a very detailed level for each individual component in order to synchronize all layers and ensure a steady work flow.
- The prime contractor model saves money. By taking on management, oversight, inspection and certification functions, the prime contractor can eliminate the need for the government manpower required to write base contracts and modifications, as well as to manage a wide range of activities. The Army does not have to pay for warehousing and personnel to inventory components or assemble kits or subsystems.

The prime contractor demonstrated significant practical benefits in the Army's move to the Multicam pattern for Operation Enduring Freedom Camouflage Pattern (OCP) uniforms. In May 2011, the U.S. Army made the determination to adopt the Multicam and established a very aggressive fielding schedule, requiring the first 10,000 kits to be delivered in July. There was no time to let a contract or run a competition. To meet this accelerated schedule, the government turned to one of its prime contractors. Even before funds were available, the prime contractor issued purchase orders, worked in collaboration with the fabric suppliers to develop the new pattern on the existing fabrications and helped the government to expedite shade evaluations and approvals. Additionally, the prime contractor worked with the trim, fabric and end item suppliers to reduce lead time barriers, ramp up production and execute delivery of fully kitted 14-piece Multicam systems in a record three months. To date, the prime contractor has delivered over 205,000 OCP systems (containing over 2.87 million garments) on time.

Improving on Success: Expanding the Use of the Prime Contractor Model for Soldier Clothing and Individual Equipment

The prime contractor model for the GEN III ECWCS program has been a success. Since the contract was awarded, the program has managed 15 garment manufacturers and 6 textile companies while shipping out millions of kits. Even as it was meeting the primary requirement to field sufficient kits to supply the entire Active Duty Army plus a large number of marines, the prime contractor was also working with PEO Soldier to modify and improve the overall quality and technological performance of the GEN III system.

The success of the GEN III effort encouraged PEO Soldier to attempt to replicate this contracting model to other programs. One of these was the Fire Resistant Environmental Ensemble (FREE). PEO Soldier wanted to provide soldiers operating helicopters and vehicles with a clothing system that met not only their need for protection against cold and wet weather but also the threat of fires. In many ways, the FREE system was similar in character and technological sophistication to GEN III. The head-to-toe, skin-to-outerwear ensemble has 17 parts and is provided in 15 sizes. The different parts of the ensemble can be worn in a variety of configurations, depending on need, the environment and the mission. The FREE ensemble is compatible with current-issue soldier protective equipment and comes in the same colors and camouflage patterns as ground soldier uniforms. According to a PEO Soldier source:



Soldiers are very pleased with the GEN III ECWCS. We're confident they'll be equally pleased with the FREE. Both use the latest in textile science to keep Soldiers comfortable, dry, warm and safe in the worst weather conditions. Also, with both ECWCS and FREE, each piece of the ensemble fits and functions either alone or together as a system, providing the Soldier as many options as possible.³

PEO Soldier chose to procure FREE using the same successful approach it had adopted for the GEN III ECWCS. A single prime contractor was chosen to manage FREE in a similar manner to that done for GEN III.

Going beyond soldier clothing, PEO Soldier also applied the same model as GEN III and FREE to the management of the Modular Sleep System (MSS). As in the cases of GEN III and FREE, the goals were to capitalize on the unique capabilities and management flexibility of a private sector prime contractor. The rationale for using the prime contractor approach was explained by the former commander of PEO Soldier, General Peter Fuller:

³ "Army Prepares to Field Fire Resistant Ensemble," at <http://peoSoldier.armylive.dodlive.mil/2010/02/17/army-prepares-to-field-fire-resistant-ensemble/>

[The new] Modular Sleep System is a complete sleep set. It is not just that it is warmer, it is less bulky, it is more compact and it is easier to carry. We are also seeing that improved mountaineering equipment is needed in Afghanistan. We don't want to reinvent the wheel here. Instead, we went to the vendors that supply professional mountaineers. Why should we design something when there is already a lot of great capability out there?⁴

Conclusions

With U.S. forces about to leave Iraq and beginning their withdrawal from Afghanistan, the question facing the Army and, more broadly, the Department of Defense is how to ensure that the innovations created over the past decade are not lost. This is particularly significant with respect to the future of soldier clothing and equipment. The current plan is to transition sustainment of soldier clothing, including ECWCS and FREE, to the Defense Logistics Agency. Such a move might make sense were it not for the potential of an ongoing technological revolution in soldier clothing. PEO Soldier has identified a number of future initiatives. These include the exploitation of new synthetics and treatments for materials, less bulky and lighter-weight designs and new camouflage patterns. For example, consideration is being given to a GEN IV ECWCS that will incorporate fire resistance, reduced bulk, greater moisture management and improved durability.

The Army and PEO Soldier should go with success, contracting with the private sector for the ECWCS and possibly FREE. Even if the military is only procuring smaller quantities of clothing keeping a prime contractor would ensure a basic supply chain for advanced textiles and clothing items. It would allow for continuation of direct vendor deliveries, thereby saving money on warehousing, management personnel and transportation costs. Maintaining the approach started



under the Rapid Fielding Initiative would also enable ongoing improvement of parts. A new contract should add a technical or research and development component or requirement to the solicitation that includes a mandatory demonstration of the ability to improve the system over time. There needs to be a provision for other government entities like the Defense Logistics Agency to purchase piecemeal or sub kits and to add new items to the contract.

⁴ “The PEO Soldier organization combines the latest technologies, in the largest volumes with smart thinking to equip the US Army Soldier,” at <http://www.Soldiermod.com/volume-5/peo.html>

The contracting model developed for GEN III ECWCS and FREE clothing systems should be considered by Program Managers in the acquisition of other soldier subsystems, particularly those that are heavily dependent in whole or part on the private sector. The Army might find it advantageous to use the prime contractor approach for such capabilities as:

- Body armor integrated with load carriage and hydration
- Advanced sleep systems
- Climbing kits/ ski instruction kits
- Modular boot system
- Integrated headborne assembly/ helmet comms/ optics/ ear protection

Each of these capabilities is built around a set of components which not only must integrate with all others but also mesh with one another into an overall Soldier System. Moreover, many of these capabilities are based on and procured from commercial materials or models. Virtually all can benefit from ongoing technology insertion and design changes.

Finally, in the transition from PEO Soldier to Defense Logistics Agency Troop Support (the latter should leverage industry strengths in supply chain and inventory management) when determining which items they will manage and which are better managed by a prime contractor. This would allow DLA Troop Support to procure just what they need from the prime contractor while maintaining a lean inventory.

Glossary of Terms

DLA	Defense Logistics Agency
DoD	U.S. Department of Defense
ECWCS	Extended Cold Weather Clothing System
FREE	Fire Resistant Environmental Ensemble
GEN	Generation
M-ATV	MRAP All Terrain Vehicle
MRAP	Mine Resistant, Ambush Protected
MSS	Modular Sleep System
OCP	Operation Enduring Freedom Camouflage Pattern
PEO	Program Executive Office
RD&E	Research, Development and Engineering
RFI	Rapid Fielding Initiative
SOF	Special Operations Forces



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