

# THE HUMAN DIMENSIONS OF SOLDERING: A PERSPECTIVE ON FUTURE REQUIREMENTS IN THE COMPLEX OPERATIONAL ENVIRONMENT

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## Abstract

For centuries past and likely for centuries to come, military leaders have debated the qualities desired in a soldier. It is easy to find that nearly every prominent military leader and researcher has advocated the importance of attributes such as courage, integrity, perseverance, intelligence, loyalty and self-confidence. All militaries considers the soldier central to mission success and emphasized the importance of better understanding moral, cognitive, and physical aspects of soldier performance across a full spectrum of operations. The human dimension of soldering meets the complex operational environment which exists today and in the near future, with the range of threats during this period extending from smaller, lower-technology opponents using more adaptive, asymmetric methods to larger, modernized forces able to engage forces in more conventional, symmetrical ways. Due to these increasing complexities coupled with rapid state of the art technological advancements, in future soldier technology envisage a different operational environment in the future but without the consideration and understanding of the capabilities of our soldiers both physically, mentally in both moral and cognitive dimensions which will ultimately limit the effectiveness of both the technologies and our soldiers. This paper describes the human dimension as the moral, cognitive, and physical components of soldier and organizational development and states that the Army concepts acknowledge the soldier as the centerpiece of the Army, but none, individually or collectively, adequately addresses the human dimension of future operations.

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**Keywords:** Human Dimension, operational environment, complex operational environment, military leadership

## Introduction

Soldiers need to be mentally prepared to perform well on operations. But there is little agreement on how commanders can best prepare the individual soldier and the unit for deployment. The Armed Forces cannot afford to focus only on current operations as a predictor of the future. It must prepare people so that future commanders can sustain operations in a time of persistent conflict. Approved military concepts describe the employment of soldiers in the future. This concept reaches beyond the issues of equipping soldiers with hardware tools of war into the more subtle moral, cognitive, and physical components of soldier development.

The human dimension is based on professional mastery and mission command, and requires high standards of training, education, doctrine, organization, and leadership<sup>112</sup>. The dimension is about the way people collaborate to share their awareness of the situation, so

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<sup>112</sup>Australian Department of Defence. (ADF) (2002) *Force 2020*. Australian Department of Defence, Canberra, ACT.

that they can fight more effectively. It requires trust between warfighters across different levels, and trust between warfighters and their supporting agencies. This emphasis has evolved from the increasingly complex and diverse operating environments in which soldiers perform, and the increased demands and stresses that are unique to current conflict (e.g., small-unit conflicts and asymmetrical warfare). Furthermore, due to these increasing complexities coupled with rapid technological advancements, the development of the very technologies aimed at supporting the military mission without the consideration and understanding of the capabilities of our soldiers will ultimately limit the effectiveness of both the technologies and the soldiers. The military leverages enhanced means to identify, access, retain, and develop soldiers with unsurpassed cognitive, physical, and social (moral and cultural) capabilities<sup>113</sup>. Soldiers are enabled by technology, cognitive, medical and social sciences to achieve excellence in small unit competence and to dominate increasingly complex operational environments. Soldiers are able to leverage technologies and processes that optimize and restore cognitive and physical performance.

This paper will look at the human dimension of soldiers in meeting the challenges of the complex operational environment (COE) in the moral, physical and cognitive components in reaction to the man, machine, and method interface whereby leadership skills will spearhead the major challenge. This paper will also highlight on the potentials, relationship and correlation of the human dimension of soldiers in meeting the challenges of the current and future complex operational environment.

### **The human evolution**

Human characteristics are defined as those traits that distinguish people from other species. They include the ability to change or alter their surroundings makes them to be unique from the rest of the animals. “Human are self-aware social mammals generally possessing the ability to reason, speak and use complex tools in complex environment to achieve an objective” (Skelton, 1999). Then we have the human trained to be soldiers who kills without care or remorse, shows no fear, can fight battle after battle without fatigue and generally behave more like a machine than a man? “A soldier is a man or woman who selflessly devotes their life to ensure that all citizens of their country can sleep with peace of mind and live out day to day without fear. A soldier gives you your freedom, and asks nothing in return” (Celestine, Ntuen and Park, 2010).

Differences exist in individuals’ genetics, their environmental and social/psychological influences, and the complex genetic-psychological interactions, which influence virtually everything about an individual soldier. For centuries past and likely for centuries to come, military leaders have debated the qualities desired in a soldier and has advocated the importance of attributes such as courage, integrity, perseverance, intelligence, loyalty, self-confidence and many more (Gifford, 2005). Technology can provide the tools and avenues by which wars are fought but it is the individual soldier on the battlefield facing life and death who remains a constant. Due to the increasing complexities coupled with the rapid state of the art technological advancements, future soldier technology envisages a different operational environment in the future which is rather complex. A soldier differs from a civilian in that he calls the final shots with his thinking cognitive capabilities and the psychomotor actions on whether he kills the enemy or the enemy kills him.

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<sup>113</sup>Army Capabilities Integration Center, US Army Training and Doctrine Command. North Carolina A&T State University. 2009 ICCRTS, Washington, DC, June 15-17

### **The complex operating environment landscape**

History also shows us it is very hard to do, and particularly with the military, it always seems to be preparing for the last war instead of the next. Predicting the future is not possible, but tools such as trend monitoring, scanning, and scenarios are very useful in assisting leaders with developing vision and strategy about future conflicts<sup>114</sup>. The Fourth Generation War (4GW) holds that warfare has progressed through four generations from the use of *massed manpower* to *firepower*, then *maneuver*, and now evolved in the form of *insurgency* that employs all available networks political, economic, social, military to convince an opponent's decision makers that their strategic goals are either unachievable or too costly (Lind,2007).

The operational environment is a composite of the conditions, circumstances, and influences that affect the employment of military forces and bear on the decisions of the unit commander (Alberts, 2007). The complex operational environment (COE) is the overall operational environment that exists today and in the near future, with the range of threats during this period extends from smaller, lower-technology opponents using more adaptive, asymmetric methods to larger, modernized forces able to engage forces in more conventional, symmetrical ways. In some possible conflicts (or in multiple, concurrent conflicts), a combination of these types of threats could be especially problematic (Stothart, 2007).

The Operational Environment (OE) sets the conditions that may lead to conflict. An ever-shrinking pool of vital resources, (food, water, energy), combines with the growing global population to stress the capacity of the world to provide an acceptable quality of life for all. The current operating environment will continue to evolve, presenting ground forces in the future with an ever increasing challenge to defeat irregular and hybrid enemies that are connected by cell phone, computer network and satellite phone technology(Robert,2011). In most cases, support from the local population in defeating these threats cannot be assumed. In addition, the possibility of major combat operations remains real. The future complex operating environment will include adversaries ranging from well-led, well-trained and well-equipped conventional military formations experienced in close fighting to irregular and hybrid forces.

At the same time, the information age has dramatically expanded people's access to knowledge and information(Alberts, David S. and Hayes, Richard E, 2003). These phenomena in shrinking resources, growing populations, ubiquitous access to real-time information to interact and merge to create a global relative deprivation. Collectively, these trends in the domestic and worldwide OE will affect the military's most critical resource, the soldier. These trends include social and cultural factors; the dynamics of geopolitics and governance; the globalization of economics and resources; the revolution in science, technology, and engineering; and, global climate change<sup>115</sup>. While globalization is not a new phenomenon, the rapidly accelerated blending of business, technology, and culture coupled with near instant media coverage offers both opportunities and threats for the future. The effects of globalization include interdependent economies, the empowerment of non-state actors, porous international boundaries, and the declining ability of the nation-state to control fully its own territory and economy, and to provide security and other services. Globalization shrinks the world and forces the interaction of differing societies and cultures.

### **The human dimension characteristics of a soldier**

The human dimension encompasses the moral, physical, and cognitive components of soldier, leader, and organizational development and performance essential to raise, prepare, and employ the military in full spectrum operations. This definition recognizes that soldier

<sup>114</sup>Research Methodology & Cognitive Science, Vol. 8, No. 1, April 2010 ; September 2010

<sup>115</sup>The U.S. Army Functional Concept for Movement and Maneuver 2016–2028

readiness everything from training proficiency to motivation to well-being is fundamental to the military’s future success. It introduces the concept of holistic fitness, a comprehensive combination of the whole person including all components of the human dimension triad. The Army leverages enhanced means to identify, access, retain, and develop Soldiers with unsurpassed cognitive, physical, and social (moral and cultural) capabilities. Soldiers are enabled by technology, cognitive, medical and social sciences to achieve excellence in small unit competence and to dominate increasingly complex operational environments. Soldiers are able to leverage technologies and processes that optimize and restore cognitive and physical performance<sup>116</sup>.

The human dimension definition also acknowledges that war, notwithstanding the inevitable changes in the purposes, ways and means, will remain a savage clash of wills. Future conflict will remain complex and chaotic, and human frailties and irrationality will continue to characterize war’s nature<sup>117</sup>. Ambiguity, danger, physical exertion, friction, and chance, constitute the climate of war, which contributes to the fog of war with which commanders must contend in future operations. The ‘ugly human implications’ of persistent conflict is also evident in the rising number of soldiers identified with Post Traumatic Stress Disorder. “By one estimate, more than 300,000 of the nearly 2 million U.S. servicemen and -women deployed since 9/11 suffer from the often-debilitating condition, with symptoms that include flashbacks and nightmares, emotional numbness, relationship problems, trouble sleeping, sudden anger, and drug and alcohol abuse (Reno,2009).Researchers at Stanford University feel this number could climb to over 500,000 in the next few years.

Technology, intelligence, and operational design can reduce uncertainty. However, commanders must still make decisions based on incomplete, inaccurate, or contradictory information. These factors will continue to play a predominant role in the environment of future full spectrum operations.USMilitary Academy, Department of Systems Engineering,West Point conducted a research on the Whole Soldier Performance (Dees,2006)which displays the final functional hierarchy of US soldier performance attribute groupings in the moral, cognitive, and physical domains as seen in **Figure 1**.

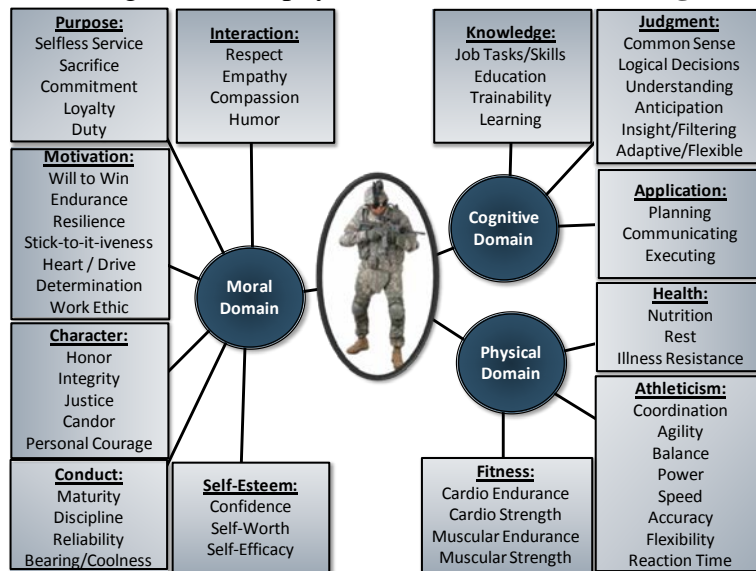


Figure 1. WholeSoldier Performance Attributes. Source: Dees,2006)

<sup>116</sup>Army Capabilities Integration Center, US Army Training and Doctrine Command.

<sup>117</sup>The Future Belongs to Those Who.... a Guide for Thinking About the Future.” *Institute for Alternative Futures*, 2-4. <http://www.altfutures.com/The%20Future%20Belongs%20to%20Those%20Who.pdf>. Internet. Accessed 9 July 2009.

In relation to a human dimension variable research, the Human Dimensions Research (HDR) team from the US Army was sent to Haiti to assess the psychological status and adaptation of the U.S. Army force deployed for Operation Uphold Democracy in 1995<sup>118</sup>. Research questionnaires were collected from 3,205 soldiers, interviews were conducted with 267 soldiers, and 1,250 soldiers provided 2,650 verbatim comments regarding the operation which were content analyzed. The HDR results demonstrated that, when viewed as a population, soldiers deployed to Haiti did not report unusually high levels of psychological distress or physical health symptoms. Subsamples of individuals did report elevated reports of psychological distress and physical health symptoms. Four sets of factors are discussed which were found to be significantly related to the well-being of soldiers in Haiti: (1) stress associated with the operational environment, (2) stress due to family separation, (3) unit and work issues, and (4) broader policy issues. The results have implications for unit leaders at all levels, mental health and medical personnel, and policy makers.

### **Man machine method interface on human dimensions in soldiers**

The Improved Man-Machine Interfaces research area is motivated by the fact that technology designed to enhance soldier performance often imposes both physical and cognitive stress on the soldier in ways that equipment developers do not envision (Gerras, 2002). Many research area addresses optimization of the way used soldiers use emerging technology by providing system designers with the knowledge and tools necessary to design equipment that does not enhance one aspect of performance while sacrificing another aspect that is critical to overall mission success. Research area focuses on understanding the interaction between physical and cognitive stress and their effect on individual dismounted soldier and small team performance, and additionally understanding the value of using alternative technologies, such as bone conduction communications and tactile displays, for providing information to the soldier (Petraeus and David, 2007). The complex operational environment focuses on the machine and method which are dependent variables in correlation with the man or the soldier who is the independent variable. The soldier has emotions, feelings, reasoning and cognitive thoughts which invariably changes according to the battlefield environment. The machine platform management is the changing environment from modern fighting equipment in land forces to aircrafts and ships promulgates from different dimensions of tactical requirements, the method, but the man ie the soldier remains a thinking platform requiring the human dimension perspective as a strong foundation in anticipation of the complex operational environment

A typical case study is the National Defence University Malaysia model of learning and education transforming from a Military Academy to a full fledge University. This conversion requires the cognitive learning from the cadets in the academic field and the end state of the defence university is to produce intellectual leaders of character through the cognitive education learning and the psychomotor requirements of military training. This is illustrated in the NDUM Model of Officer Development Construct in **Figure 4**<sup>119</sup>.

<sup>118</sup>Headquarters, Department of the Army Training and Doctrine Command (2008). *TRADOC PAM 525-3-7-01, The U.S. Army Study of the Human Dimension in the Future 2015-2024*, Ft. Monroe, VA.

<sup>119</sup>NDUM Strategic Plan[Revised] 2012-2015.Creating a Future Excellence. (2013)

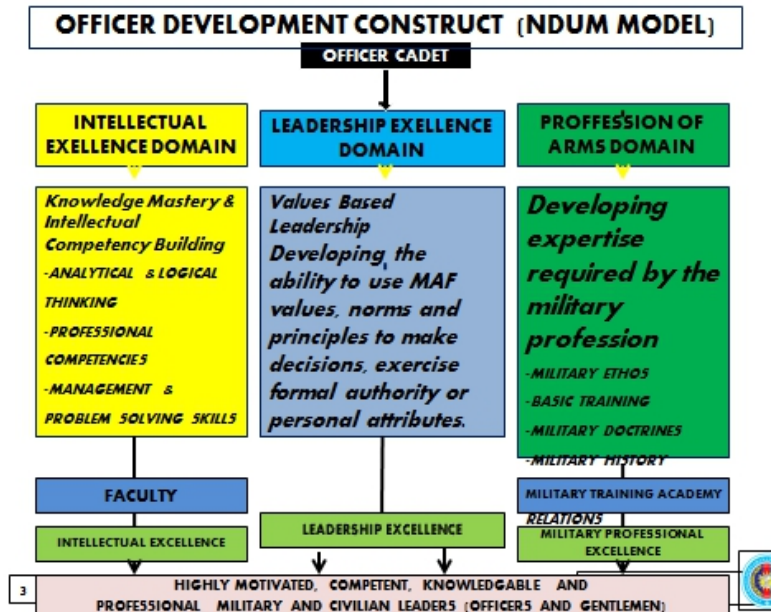


Figure 4. National Defence University Malaysia Model of Officer Development Construct (Source: NDUM Strategic Plan[Revised] 2012-2015.Creating a Future Excellence)

A mix of laboratory, simulation, and field experiments are used to determine the effects of soldier equipment (load carriage devices, helmets, weapon sights, information systems, tactile systems, etc.) on performance (Skelton,1999). New approaches to measure human-system performance that are both operationally relevant and minimally invasive are being developed.

A study by US Army TRADOC<sup>120</sup> describes the human dimension as the “moral, cognitive, and physical components of soldier and organizational development” and states that “Army concepts acknowledge the soldier as the centerpiece of the Army, but none, individually or collectively, adequately addresses the human dimension of future operations.” Within the context of the expected future global operating environment, this study looks in depth at expected soldier performance in the moral, physical, and cognitive domains. **Figure 53** is a visual depiction of the established operational problem statement:

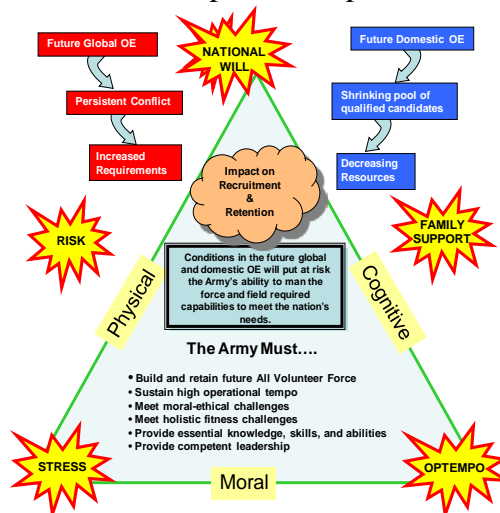


Figure 5. Depiction of Human Dimension Operational Environment (Source: TRADOC 13 SEP 2008)

<sup>120</sup>TRADOC Pamphlet 525- 3-7-01: The U.S. Army Study of Human Dimension in the Future 2015-2024; Chapter 1. 1 April 2008

In **Figure 5**, the expected future global operating environment is characterized by persistent conflict, resulting in increased demand for quality soldiers while we expect to simultaneously observe a future domestic operating environment characterized by decreasing supply. All the while, “the military will require extraordinary strength in the moral, physical, and cognitive components of the human dimension, existing accessions, personnel, and force training and education development efforts will not meet these future challenges.”

### **Current operational requirement for soldiers**

Current trends in the global and domestic operational environments will challenge all militaries operational ability to maintain a future responsive, professional and reactive force. Soldiers will operate in an era of persistent conflict amongst populations with diverse religious, ethnic, and societal values. The psychological individual and collective readiness is attributed to their combat performance as soldiers are convinced that their team or unit would perform well on operations, this will bolster their sense of readiness, increase how much effort is put into group tasks and augment the degree of persistence when group efforts do not deliver expected outcomes (Hannah and Sweeney, 2007). In an Israeli Defence Force study Shamir, Brainin, Zakay and Popper (2000), beliefs about collective readiness in combat units were examined. Out of a range of variables (soldier experience levels, leader tenure in the current unit, leader confidence in the unit, soldier confidence in leadership, unit discipline levels and identification with the unit) the strongest predictor of perceived combat readiness was the identification with the unit. Unit identification has been called “vertical cohesiveness”, “vertical bonding” and “organizational cohesion” but most commonly known in the military it is known as spirit de corps<sup>121</sup>. Faced with continuous employment across the full range of military operations, the military will require extraordinary strength in the moral, physical, and cognitive components of the human dimension. Existing accessions, personnel, and force training and education development efforts will not meet these future challenges, placing at grave risk the military’s ability to provide combatant commanders the forces and capabilities necessary to execute the all military and national defense and security policies. Improved capabilities must address the broad range of human dimension actions necessary to prepare, support, and sustain this force.

### **Relationship between human dimension of soldier and coe**

People accomplish the mission. It is the human dimension with its moral, cognitive and physical components that enables land forces to deal with the situational complexity of tactical actions with strategic impacts and adapt to rapidly changing conditions. This emphasis has evolved from the increasingly complex and diverse operational environments in which soldiers perform, and the increased demands and stresses that are unique to current conflict (e.g., small-unit conflicts and asymmetrical warfare).

Future operations such as the Three Block War concept illustrate the complex spectrum of challenges likely to be faced by soldiers on the modern battlefield (Krulak, 1999). Soldiers may be required to conduct full scale military action, peacekeeping operations and humanitarian aid within the space of three contiguous city blocks. The thrust of the concept is that modern militaries must be trained to operate in all three conditions simultaneously, and that to do so, leadership training at the lowest levels needs to be high.

For the foreseeable future, militaries will continue to operate in complex environment that challenge soldiers, leaders and organizations. The military cannot afford to focus only on current operations as a predictor of the future. It must prepare people so that future

<sup>121</sup>1 TRADOC Pamphlet 525-3-7-01. The U.S. Study of the Human Dimension in the Future 2015–2024. <http://www.tradoc.army.mil/tpubs/pams/p525-3-7-01.pdf> (accessed 2008). (Training and Doctrine Command [TRADOC], 2008).

commanders can sustain operations in a time of persistent conflict. Approved military concepts describe the employment of soldiers in the future. This concept reaches beyond the issues of equipping soldiers with hardware tools of war into the more subtle moral, cognitive, and physical components of soldier development(Gifford,2005).

### **Leadership challenges in a complex future environment**

The crucible of combat both requires and forms leaders. The complexity of the future OE creates new demands on future leaders, most evidently in information management. Today, individual soldiers from the lowest to the highest echelon follow the situation across entire theaters of operation. Knowing more and sharing a common operating picture reduces uncertainty, increases situational awareness and understanding, and enables mission command and self-synchronization,tenets of both current battle command doctrine and future battle command concepts (Matthews,2005). Having such visibility may also create stress and the potential for information overload.

Developing the means to manage knowledge and to get the right information to the right people has both technical and human solutions. Successful leaders learn what is critical and what is not. This skill or talent rises from experience more than any other source. It suggests that one of the critical issues in leader development in the future will be creating opportunities for leaders to cope with complex information and high-pressure rapid decision making.Full spectrum operations demand the ability to transition from major combat to humanitarian assistance, and everything in between, repeatedly and rapidly. Soldiers will face life and death decisions with little time to reflect.

Persistent conflict presents another present and future leadership challenge. Humans respond relatively well to short bursts of tension followed by periods of respite. Soldiers steeled for a lengthy deployment in a non-linear conflict of indeterminate duration must respond in a new way. In such conflicts, Soldiers must focus on mission progress while tolerating setbacks and understanding that settling the basic conflict may take years. Unpredictability and changing circumstances tax even the best of highly motivated units. Leaders must learn to mitigate this for their subordinates and cope with it in themselves.The list of ‘human implications’ caused by persistent conflict is probably infinite. However, the aforementioned cover many of the main issues and help identify three strategic issues that must be addressed by leaders in all Armed Forces (Gates,2007):

- How to best exploit the positive effects of persistent conflict.
- How to balance the training, readiness and force structure to win the current conflicts and stay ready for the future.
- How to achieve and maintain the proper end strength to reduce stress on the force now and in the future.

### **Leadership changes in meeting future human dimensions in soldiers**

Leadership in the future more than ever will require adaptive decision making based on an assessment of the situation as viewed through the eyes of subordinates armed with the commander’s intent and support. Research will focus on how to improve leader adaptability across the full spectrum of operations, including personal and interpersonal skills such as perspective taking, self-awareness, and influence techniques within the chain of command and across organizational and cultural boundaries<sup>122</sup>. Leader stability, optimism, open communications, and frequent presence at training are essential to developing an environment

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<sup>122</sup>Canadian Forces Leadership Institute (2005), Leadership in the Canadian Forces: Doctrine, Canadian Defence Academy, Kingston.



of confidence, trust, and respect. Research efforts will develop and empirically validate measurement and feedback techniques to assess and improve leader effectiveness.

### **Military training and education**

Developing future leaders will require rebalancing the combination of training, education, and experience the Army currently uses. Training develops skills and techniques through practice and observation. Educating leaders must include emphasis on developing a cooperative leadership style that releases authority to the lowest level of competence. Training and education on theory and application of both cohesive and leader team building skills and conflict resolution is necessary at all levels of the professional military education system. Mid-level and senior leaders will have to learn to function in joint, civil-military, and coalition-based operations, understanding the differences in style, culture, and expertise necessary in those settings. Experience will remain progressive and will influence selecting and pairing of leader teams for compatibility not in terms of similar attitudes or complementary leadership styles, but in terms of their ability to work together and respect each other's views<sup>123</sup>. Future leaders must excel in their ability to build rapidly adaptive, cohesive, and high performing teams. Future soldiers must excel in their ability to be effective team members and effective followers. The shift from training for operations within sharply defined institutional chains of command, to the conduct of highly decentralized, politicized, and collaborative operations involved in future full spectrum operations, has placed a high value on negotiation skills. Traditionally military leaders have a great deal of experience negotiating but not necessarily in contexts of ambiguous authority, limited political guidance, and significant cultural diversity. This set of trainable skills needs to be progressively more sophisticated as leaders increase in grade and responsibility.

Future leaders must excel in their ability to build rapidly adaptive, cohesive, and high performing teams. Future Soldiers must excel in their ability to be effective team members and effective followers. Geographical dispersion will heighten the need for shared understanding of the commander's intent and teamwork built on trust. Emerging communications methods (force tracking, on demand teleconferencing, instant messaging, virtual collaboration, e-mail, text messaging, podcasting) will become the norm for interactions among team members and between leaders and their teams. Teams and task forces will form and operate without opportunities for face-to-face encounters between leaders and subordinates. Leaders and their followers must learn the principles of effective teamwork at a distance and understand the roles and impacts of various communication media in building effective distributed teams.

### **Reassessing the future requirements of human dimension in soldiers**

The move from traditional warfare engages soldiers with traditional weapons and traditional human dimensions and mindsets. But the future soldier needs to be rebranded and seek away from the mainstream generic responsibilities as the future warfare looks at different dimensions of the playing fields and the rules of the games has changed drastically. The universal traditional battled field has moved from the traditional threats to nontraditional threats which require a different approach of training and leadership skills.

To operate effectively under conditions of uncertainty and complexity in an era of persistent conflict, future forces and leaders must strive to reduce uncertainty through understanding of the situation which gazes at the volatile, uncertain, complex and ambiguous (VUCA) environment and situation in which we are facing in complex operational

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<sup>123</sup>TRADOC Pamphlet 525- 3-7-01: The U.S. Army Study of Human Dimension in the Future 2015-2024; Chapter 1. 1 April 2008.

environment(Satish, Usha and Streufert 2006). This emphasized the importance of future soldiers' attributes in knowledge; skills and attitude which need to be relook and synchronized with the training cultures to meet the demand of COE. The military must exploit current and emerging human dimension developments to increase the effectiveness of our human dimension programs and policies. Army decision makers will have to support that effort by identifying the most critical required capabilities across all doctrine, organization, training, materiel, leadership and education, personnel, and facilities domains. Then Army policy executors will have to partner with the influencers who specialize in the components of the human dimension and the art and science of leadership in order to recruit, lead, and manage the next generation of Soldiers.

## Conclusion

The human dimension encompasses the moral, physical, and cognitive components of soldier, leader, and organizational development and performance essential to raise, prepare, and employ the Army in full spectrum operations. Army concepts acknowledge the soldier as the centerpiece of the Army, but none, individually or collectively, adequately addresses the human dimension of future operations. The soldier performance attribute groupings in the moral, cognitive, and physical domains provides a platform for the intangible factor needed in the human interface in man machine method. Today the across the world everyone is facing several challenging, dangerous, and potentially inescapable geo-strategic trends. These trends include social and cultural factors; the dynamics of geopolitics and governance; the globalization of economics and resources; the revolution in science, technology, and engineering; and, global climate change.

The machine is just a tool for the soldier in battlefield and the tactics is the method but overall the soldier is the platform using all his training in cognitive reasoning in making significant decisions in the battlefield whereby the machine an method is just the psychomotor aspect in assisting him meet his goals. At such what would the emphasis be for the future COE in relation to the human dimensions of soldiers especially the Y generation soldiers? How will Armed Forces deal with such changing environment and technological advancements to ensure the human dimension in soldiers continue to uphold the warrior spirit? Maybe the future training and education for individual and collective training for soldiers need to be relook and seek new avenues in terms of the push and pull factor for soldiers? The solution probably will be derived from how best we recruit, train, and retain our forces including the package of training methods of which soldiers can operate across the spectrum and range of military operations in the future operational requirements.

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