



**NATIONAL DEFENSE UNIVERSITY  
NATIONAL WAR COLLEGE**

**MILITARY TRANSFORMATION FOR THE CHANGING CAUSE,  
CHARACTER AND CONDUCT OF CONFLICT IN THE 21<sup>ST</sup> CENTURY**

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MILITARY THOUGHT AND THE ESSENCE OF WAR  
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**MILITARY TRANSFORMATION FOR THE CHANGING CAUSE,  
CHARACTER AND CONDUCT OF CONFLICT  
IN THE TWENTY FIRST CENTURY**

“Thus, those skilled in war subdue the enemy’s army without battle. They capture his cities without assaulting them and overthrow his state without protracted operations.”

- Sun Tzu on Offensive Strategy

“War is thus an act of force to compel our enemy to do our will...Force – that is, physical force, for moral force has no existence save as expressed in the state and the law – is thus the means of war...”

- Clausewitz “On War”

"This is another type of war, new in its intensity, ancient in its origin - war by guerrillas, subversives, insurgents, assassins, war by ambush instead of combat, by infiltration instead of aggression, seeking victory by eroding and exhausting the enemy, a warfare uniquely adapted to what has been wrongly called wars of liberation, to undermine the efforts of new and poor countries to maintain the freedom that they have finally achieved. It preys on economic unrest and ethnic conflicts. It requires understanding of those situations where we must counter it, and these are the kind of challenges that will be before us in the coming decades if freedom is to be saved; a whole new kind of strategy, a new and wholly different kind of military training."

- John F Kennedy, 1962

## **Introduction**

Transformation engineered by Revolution in Military Affairs (RMA) has become the byword of the US Armed Forces, and by a ripple effect of the armed forces worldwide. The objective is to create a “leaner and meaner” technology driven military, a near-perfect fighting machine backed by near-perfect intelligence. However, the current efforts at transformation possibly do not pay adequate attention to the changing cause, character and conduct of conflict. There is a very real possibility that the transformed military will design itself out of the capability to combat emerging conflicts of the 21<sup>st</sup> Century.

The 20<sup>th</sup> Century was the most violent period in the history of mankind. The Napoleonic concept of levee en masse was perfected in the two World Wars as the world graduated from the concept of a conflict between armies to a nation-in-arms. This, in turn witnessed the transformation of the military machine into an efficient mass killer which then logically evolved into the concept of total nuclear annihilation – technology gave the power to mankind to completely destroy itself many times over. The dissolution of the Soviet Union has created an overwhelming military asymmetry in favor of the United States universally, and of a few other nations, regionally. This has initiated growing irrelevance of the Napoleonic concept. The world now seems to be moving towards low intensity conflict, fought by unconventional methods to overcome overwhelming conventional asymmetry. Also, technology is blurring the distinction it once created between the military and the civilian – the “warriors” of Al Qa’eda do not wear jackboots.

The cause for conflict is changing, creating new battle spaces and high grounds. Wars in the 20<sup>th</sup> Century were fought over ideologies within territories and the spread of a given ideology by the physical expansion of territory. Globalization and overarching spread of the Information Highway is dissolving territorial boundaries. This, in turn is negating the requirement of physical occupation of a territory to spread and share an ideology. The Information Highway is also eroding the traditional concepts of military hierarchy and military balance of power. It has become the first new high ground of future conflict.

The current world population of 6.0 billion is expected to double in the next 40-60 years. The population boom is creating increasing pressure on the sharing of natural resources, particularly, fossil fuels and fresh water, which are the two critical resources.

At the current rate of consumption, the existing proven oil reserves will be exhausted in 40 years. Fresh water is expected to become a critical resource by 2025. States will increasingly be drawn into conflict over control over resources. Resource wars will be the wars of the 21<sup>st</sup> Century.<sup>1</sup> Control of resources thus becomes the second new high ground of future conflict

The changing character of the foe is bringing about the changing character and conduct of war. Massed armies, large armadas and fleets of aircraft trained and arrayed to crush the opponent's similarly arrayed military machine are becoming redundant. The Clausewitzian concept of the use of overwhelming force and violence to break the will to fight seems to be giving way to Sun Tzu's concepts of strategic excellence lying in the ability to win without violence.

The increasing integration between the military and the non-military and the almost complete dependence of both on the information network has created a completely new set of vulnerabilities, which can be exploited by non-military means. Information warriors are exploiting areas that transcend existing military doctrines and capabilities. The growing dependence of societies on the Information Highway has created new ways of striking at a foe, completely circumventing existing military might. The key has become disruption and not destruction.

This paper will attempt to briefly analyze the components of the changing cause, character and conduct of conflict, the changing character of the foe and the emerging vulnerabilities. An attempt will then be made for defining the direction for required military transformation in the 21<sup>st</sup> Century.

### **The Changing Cause, Character and Conduct of Conflict**

Revolution in Military Thought: Modern armed forces continue to be basically tailored on the operational necessities defined by Clausewitz, that is, the need for overwhelming military force to subdue an enemy similarly deployed. This continues to be the basic premise of RMA based transformation. The ghost of Clausewitz is being kept alive. However, the treatises of Clausewitz and his contemporaries were based on the underlying political objectives of territorial security, territorial gain and the balance of power. Military thinkers of yore never did need to factor firstly, the diffusion of territorial boundaries spurred by the Information Highway, and secondly, the growing pressure on

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<sup>1</sup> Michael T Klare, [Resource Wars: The New Landscape of Global Conflict](#), (New York, Henry Holt & Co, 2002)

vital natural resources created by an exploding population on the one hand, and the awesome gluttony of resource consumption on the other. Alvin and Heidi Toffler in their seminal work, “War and Anti War,” have predicted territorial irrelevance of state boundaries. As the world moves into the 21<sup>st</sup> Century, the ability to control the two new high grounds of the Information Highway and vital natural resources will dictate national security. Unfortunately, Revolution in Military Affairs has not been accompanied by a Revolution in Military Thought. We remain content to re-interpret the great military thinkers of the 19<sup>th</sup> Century – a mistake that led to the catastrophe of World War I and of the wars that followed.

Information Highway - The First New High Ground of Conflict: It may be argued that the progress of civilization and the development of socio-political structures were based on the premise of managing conflict. This led to the concepts of state, security, government and military forces and all that is required to sustain them. These structures are being eroded by the rapid spread of the Information Highway across the world. The Information Highway is also increasing broad-based societal dependency. State governance, public services and infrastructure, economy, commerce, industry and the growing penetration and increasing reach of the media are all dependant on it. The Information Highway has become the pivotal apparatus interconnecting and controlling all instruments of state power. It is no longer a support function. The growing state and societal dependence on the Information Highway creates a growing vulnerability. When coupled to its “strategic reach,” one can safely conclude that the Information Highway is a vital strategic resource. Its pivotal role needs to be acknowledged by reviewing existing organization structures, doctrines and policy. The Information Highway is the first new high ground of conflict.

Information Warfare is a potent weapon, targeted against the Information Highway. The scope of Information Warfare ranges from the enemy on the battlefield to the functioning of society. Potential battlefields, fronts and Areas of Responsibility (AOR) can no longer be precisely defined. The information revolution is weakening hierarchy and strengthening networks, which are lateral in nature. These networks are diluting the traditional hierarchical structure of the armed forces. Information Warfare is also a great leveler. Non-state actors can wage it with the same felicity as the established

legitimate organs of the state. When juxtaposed against traditional warfare, Information Warfare has the following differences<sup>2</sup>:

| INFORMATION WARFARE                                                                                | TRADITIONAL WARFARE                                                                   |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| No geographical boundaries                                                                         | Geographically defined theatre of war                                                 |
| No decision matrix                                                                                 | Defined decision matrix:<br>Strategic, Operational, Tactical                          |
| No clear distinction between<br>War and Peace<br>Warlike and Criminal<br>Rogue and Civilized State | Distinction between<br>States / Levels of Conflict<br>Definition / Character of Enemy |
| Cannot achieve conflict resolution                                                                 | Can achieve conflict resolution <sup>3</sup>                                          |

Vital Natural Resources - The Second New High Ground of Conflict: The accelerated depletion and the growing dependence on two vital natural resources, fresh water and carbon based fossil fuels, is leading to growing friction and confrontation over the control of these resources. Vital natural resources are the second new high ground of conflict. The criticality and implications of the growing shortages are discussed below.

- (a) Fresh Water: Water is becoming the most critical resource in the world. It is predicted that by 2025, at least 65 countries will face serious water shortages. Around the world, 80 countries already face declining agricultural production due water shortages. 9,500 children die every day due to water shortage or water related disease. These are the portents of the rapidly growing worldwide water scarcity. Currently, 300 million people face severe water shortages. By 2025, this figure will increase to 1.5 billion. Areas with the fastest growing populations (North Africa, the Middle East, Central Asia) also have the most rapidly growing water shortages. The situation is exacerbated by the geographical fact that a large number of water resources are shared by two or more countries or by two or more states (regions) of the same country. Even within the country (including in the

<sup>2</sup> Maj Gen Yashwant Deva (Retd), [Information Warfare For The Theatre Commander](http://www.idsa.india-org/an-aug-7.html), [www.idsa.india-org/an-aug-7.html](http://www.idsa.india-org/an-aug-7.html)

<sup>3</sup> Author's Note: The inability of Information Warfare to achieve conflict resolution leads to the definitive requirement of and the primacy of traditional military forces to achieve a decision in war. Information Warfare, however, is most effective for neutralizing conventional military asymmetry. When thus employed, it becomes a potent weapon in the hands of the emerging foe of the 21<sup>st</sup> Century.

United States), there are growing disputes on water rights. Although a few river systems are covered by treaties of water sharing rights, (sharing the Danube in Europe, the Indus system and the Ganges system in the Indian sub-continent, the Nile in North Africa), there are major transnational river systems in every continent where there are no treaties on water sharing. US Intelligence agencies have identified 10 potential flash points over water disputes, worldwide. The bottom line is that wars of the future may be fought over water resources.<sup>4</sup>

(b) Fossil Fuels: The relationship between military policy and petroleum, the most vital of the fossil fuels, began with the British decision to convert combat vessels from coal to oil in 1912. Since then, energy resource security has become a paramount factor for conflict. This includes Operation Desert Storm and Operation Iraqi Freedom. While the economies of the developed world continue to depend heavily on the assured uninterrupted supply of oil, the rapidly growing energy demand in developing countries led by China and India (3.8 percent annually) has added new competitors in the field. The energy demand in China, India, Brazil and Mexico is expected to triple by 2020. Overall, the world's projected energy consumption from fossil fuels will increase by 63 percent (from 1996 to 2020). Simultaneously, the world's current petroleum reserves are expected to last for 40 years. This figure is likely to reduce to 25-30 years, if the projected annual growth rate of 2.1 percent is factored in. The "Strategic Triangle," encompassed within the baseline joining the Persian Gulf to the South China Sea with its apex at the Caspian Sea, contains 47 percent of the world's current oil production facilities and 74 percent of the world's proven reserves of oil. A majority of the world's supply of natural gas is also located within this region. The Strategic Triangle not only encompasses the countries with the fastest growing demand for energy, but also the world's most unstable regions of territorial, ethnic and ideological conflict. Therefore, there is growing likelihood of conflict within the Strategic Triangle – especially when viewed from the perspective of internal energy demands of countries within the triangle versus the energy demands of countries outside the triangle.<sup>5</sup>

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<sup>4</sup> Dr Paul Simon, [Tapped Out](#) (New York, Welcome Rain Publishers, 1998), 4-13, 60-82

<sup>5</sup> Klare, 15-58



The criticality of fresh water scarcity will first affect West Asia,<sup>i</sup> located within the Strategic Triangle. When this is factored into the energy supply and demand profile, it may be safely concluded that the Strategic Triangle is likely to be the battle space for wars of the 21<sup>st</sup> Century.

### **The Changing Character of the Foe**

The Second World War resulted in the demise of multipolarity and the emergence of bipolarity. The Cold War provided further impetus to the United States and the Soviet Union to develop conventional and non-conventional military capabilities far in excess of the logical requirement. Both countries devoted an incredible amount of time and resources in the race to maintain the balance of power. And while they maintained some semblance of parity, the rest of the world was left a distant second. The acquisition of such overwhelming military capability, followed by self-destruction of the Soviet Union, resulted in an unexpected consequence – the emergence of a new kind of foe.

The changing character of the foe was not an evolution. It was an historically cyclic response to overwhelming military (and economic) asymmetry. History has witnessed the rise of the guerilla whenever man is faced with insurmountable conventional power. The terrorist of today, it may be argued, is nothing but an urban guerilla. History also bears witness to the metamorphosis of the guerilla into a legitimate political entity, finally gaining the governance of a nation or of establishing a new nation. The most successful examples in the 20<sup>th</sup> Century being Mao Zedong, Ho Chi Minh and Fidel Castro. In today's world, where a few countries led by the United States possess overwhelming military superiority, the only viable option left to the challengers is unconventional warfare – euphemistically termed as low intensity conflict operations (LICO), where the challenger, labeled the terrorist, the insurgent, the ultra, or the militant, aims at involving the great power in low intensity conflict operations. Success of LICO by the Viet Cong against the United States in the Vietnam War remains an undeniable symbol of inspiration to the aspirations of modern-day separatists against a great military power.

A mutation of the modern day guerilla has created the second type of modern foe. While the terrorist operates at the low intensity conflict end of the spectrum of war, his mutant prefers the other extreme of the spectrum. He strives to negate the asymmetry of the balance of power equation by the threatened use of WMD. This mutant is infinitely more dangerous, for he has already achieved political legitimacy. He maintains

legitimacy through subjugation within, which in turn gives him the resource base for developing and deploying WMD, with an unstated but implied threat of use. And this threat helps him to cling onto political legitimacy. He has thus developed and controls a self-perpetuating cycle of power. Political leadership in North Korea and the military dictatorship in Pakistan are prime examples.

The commonality between two emerging types of foes in the 21<sup>st</sup> Century is:

- (a) They are absolutely dependent upon the continued support (forced or otherwise) of a captive human resource base.
- (b) They write their own rules. It may be argued that their very survival depends upon the premise that the international community will continue to play according to the established set of norms of international behavior.

Therefore, the key vulnerabilities of the emerging foe of the 21<sup>st</sup> Century lie in denying the resource base and the luxury of operating according to his set of rules. Robert Kaplan observes that, “America’s military superiority guarantees that such new adversaries will not fight according to our notions of fairness: they will come at us by surprise, asymmetrically, at our weakest points...Foolish dictators like Saddam Hussein, who fight conventional wars against us are historically rare...”<sup>6</sup>

### **The Emerging Vulnerabilities**

Geographical Invulnerability and the Information Highway: The Great Wall of China stands as a mute symbol of building geographical invulnerability. It led to the creation of the enigma of the Forbidden Kingdom. Similarly, American exceptionalism and idealism is a product of geographical invulnerability. Technology has breached this shield. Great standing armies, created to overcome geographical vulnerabilities and ensure national sovereignty, stand powerless as the Information Highway leapfrogs over them, encompassing the whole world. The worldwide information network is intricately interconnected, making it increasingly difficult to define national boundaries or areas of responsibility. It also permits innumerable access paths difficult, if not impossible to police. Near-total dependence on the Information Highway in the United States and other developed countries creates an absolute vulnerability. The targeted country could theoretically be brought to a state of chaos followed by standstill.

Military Effectiveness and the Information Highway: Effectiveness of modern military forces is also directly dependent on the Information Highway. Current efforts at

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<sup>6</sup> Robert D Kaplan, [Warrior Politics](#) (New York, Vintage Books, 2002) 9-10

transformation are only increasing this dependency. A situation is being created where it will no longer be necessary to physically defeat the adversary – just “pulling the plug” would suffice to leave him powerless.

Increasing Logistical Dependency and Close Control: Growing sophistication of the armed forces has increased its logistical dependency. The “tooth-to-tail” ratio continues to grow. The logistical dependency is also reducing stand-alone capability. This vulnerability has been enhanced by close control enabled by the Information Highway. Close control, in turn, is destroying the successful concept of *Auftragstaktik*, mission tactics; a command method stressing decentralized initiative within an overall strategic design.<sup>7</sup>

Inability to Live off The Land: Napoleonic armies owed their increased mobility in part to the ability to live off the land. The failure of German armies in Operation Barbarossa may also be partly attributed to their inability to do so. This vital ability has been designed out of the repertoire of modern armies. Conversely, the emerging foe is adept at doing so. The inability of modern armies to live off the land further accentuates their logistical vulnerability.

Resource Vulnerability - Energy Supply: Rapid depletion of fossil fuels is increasing the resource vulnerability of nations. The enormous imbalance between demand and supply (the United States consumes 25 percent of the world’s energy resources, but has only 2.9 percent of the world’s proven oil reserves<sup>8</sup>) makes energy supply by far the greatest vulnerability facing the United States. A similar situation applies to Europe, China, India and other rapidly developing countries. The need to secure energy supply routes has become increasingly critical. The US Department of Defense has identified five international choke points in the energy supply routes.

Resource Vulnerability - Fresh Water: A large number of countries are becoming increasingly vulnerable to the growing scarcity of fresh water. Even within the United States, the three fastest growing states of California, Texas and Florida will soon face major difficulties. Dr. Paul Simon asserts “no nation’s leaders will hesitate to battle over

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<sup>7</sup> Gunther E Rothenberg, *Moltke, Schlieffen and the Doctrine of Strategic Envelopment*, ed. Peter Paret, *Makers of Modern Strategy* (New Jersey, Princeton University Press, 1986), 296

<sup>8</sup> The United States Department of Energy, *International Energy Outlook*, 1999 and Amoco, *Review of World Energy*, 1999.

adequate water supplies.”<sup>9</sup> The United States will be called upon to play an increasing role of arbitration in international water disputes.

### **Transformation For The Changing Cause, Character and Conduct of Conflict**

A Doctrinal Approach to Transformation: The current approach towards military transformation is flawed; it is driven solely by the RMA, made possible by technology. This approach ignores the major lesson of World War II<sup>10</sup> and the Vietnam War.<sup>11</sup> The first precept of change is that, it first needs to be determined if change is necessary, and if it is, then the objective of transformation need to be clearly defined. Transformation must be doctrine based rather than technology driven. What is being suggested here is a need for developing a doctrine based on an understanding of the changing cause, character and conduct of conflict. Once the doctrine is in place, the force structure requirements will be determined. Technology can then be employed to transform existing capabilities into required capabilities. While doing so, the important aspect of the time lag required for technology absorption must be factored in. This time lag can extend up to a decade and beyond.

Transformation for the Changing Cause of Conflict: The Information Highway and Vital Natural Resources (fresh water and fossil fuels) are the two new high grounds of conflict. Transformation must be aimed at preserving these two high grounds.

- (a) Protection of the Information Highway - The First New High Ground of Conflict: Protection begins by acknowledging that the Information Highway is a vital strategic asset. All further considerations must flow from this precept. This includes granting it the status of a vital strategic asset in international fora (as already proposed by Russia at the United Nations in 1998). This would then allow creation of regulations governing hostile use of the Information Highway and the required punitive measures. The next step would involve the regulation of private (civilian) control over the Information Highway. This would entail amalgamation of civilian structures into military structures, followed by creation of a Critical

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<sup>9</sup> Dr Paul Simon, 4

<sup>10</sup> Kulger and Binnendijk, writing in “Choosing A Strategy”(Transforming America’s Military, Washington DC, National Defense University Press, 2002, 65), observe that, “In the end, nonetheless, the outcome (of the Second World War) was driven by sheer numbers and mastery over modern doctrine, not by technological supremacy or different levels of physical transformation.”

<sup>11</sup> Kulger and Binnendijk, 68, “US forces returned from Vietnam, frustrated by their inability to translate sophisticated technology into decisive victory.”

Infrastructure Protection doctrine as the overarching doctrine, with policies to match. Acknowledgement of the primacy of the Information Highway will also require a review and a possible transformation of existing military organization structures. The pyramid will have to start giving way to a lateral structure. There will also be the requirement to create an overarching Information Operations organization, which operates, not in support of but rather as a preclusive weapon of war, ahead of the actual combat elements. Information Operations will include Information Assurance and Information Warfare, operating on the principles of denial, force enhancement and survivable situational awareness.<sup>12</sup> The Information Warfare segment would include dedicated sub-organizations for control and employment of lethal and non-lethal IW weaponry.

(b) Vital Resource Protection - The Second New High Ground of Conflict: Military transformation must be aimed at prevention / amelioration of transnational water disputes and at protection of energy supply sources and energy routes. In both cases, a compression of time and space and the ability to bring on decisive application of force in the shortest possible time would be of the essence. This would imply the constant requirement of a residual presence, and residual logistics at selected places, backed up by the ability to deploy rapidly. This aspect of transformation is being looked into deeply in the US armed forces. However, in order to ameliorate the requirement of extensive residual presence, there is a need for developing a doctrine of “International Joint Operations,” wherein the armed forces of the ally could be equipped, trained and made interoperable to serve as an extension of US armed forces in a defined area.<sup>13</sup> Also, forward deployed forces must be designed to operate across the complete spectrum of conflict. This would negate the foe’s attempts to overcome military asymmetry. The foe will employ ingenious devices to overcome the technology divide. Therefore, self-sustainability and adaptability of the forces needs to be strengthened.

Transformation for the Changing Character and Conduct of Conflict: The changing character of the foe is a key factor in changing the character and the conduct of conflict. As mentioned earlier, key vulnerabilities of the emerging 21<sup>st</sup> Century foe are

<sup>12</sup> Maj Gen Yashwant Deva (Retd)

<sup>13</sup> The local component of the international joint force would be able to satisfy two other key requirements of modern conflict, Humint and peacekeeping.

dependence on a captive human resource base and the assumption that the adversary will play by the rules. In addition, the modern foe attempts to overcome asymmetry by expanding time and space. He can be patient, bide his time and strike at a time and place of his choosing. Therefore, as a first step, there is a requirement to develop doctrine that addresses the exploitation of the two vulnerabilities described above, and simultaneously denies expansion of time and space. Military transformation must be aimed at proactive capability and the ability to convert a reactive stance into proactive action by insistent, sustained and protracted operations.

A suggested strategy that could have been adopted to overcome Ho Chi Minh's insurgency in Vietnam would have involved denial of resource base by securing the area of occupation internally, identifying and eliminating the support base within South Vietnam and then negotiating from a position of strength, offering suitably calibrated political legitimacy to Ho Chi Minh.

In the process of transformation to combat the changing character of the foe, primacy of air power needs to be acknowledged. Only air power, or ground forces supported by air power and backed by accurate real-time intelligence, verified by complementary human intelligence, can effectively deny time-space expansion, so vital to the survival of the foe. The concept of a ground maneuver force, which operates in support of air power, entailing a reversal of traditional roles has been successfully tried out by US forces in Afghanistan. This concept now needs to be enshrined into doctrine, after shedding traditional force rivalries. However, while doing so, the effectiveness of using a \$ 2.0 billion platform to deliver a \$ 2.0 million weapon, which destroys a \$ 200 target, needs to be re-examined. A much more effective cost-benefit ratio would point towards employment and further development of helicopters. Helicopters are also potential key component in the doctrine for denying time-space expansion to the emerging foe of the 21<sup>st</sup> Century.

Despite the growing use of low intensity conflict operations, the need for a strong conventional military remains. This remains the lesson to be learned from the three successful insurgencies of the 20<sup>th</sup> Century, i.e., China, Vietnam and Cuba. Only strong conventional forces can deter and eventually defeat of an insurgency.

### **Conclusion**

Military transformation today is fashioned by the inverted process of acquiring new technology and then writing operational doctrines for effective use of that

technology. Very little thought is given to studying the fundamental requirement of change. The cause, character and conduct of conflict in the 21<sup>st</sup> Century are changing. These changes is being brought about by the changing nature of the foe, which has evolved as a result of the overwhelming military asymmetry created by the United States and a few other nations.

The Information Highway and Vital Natural Resources (fresh water and fossil fuels) are becoming the two new high grounds of conflict. The need for “occupying and securing” these two new high grounds of conflict, in addition to effectively combating the emerging type of foe is becoming the paramount mission of the 21<sup>st</sup> Century. From this understanding emerges the need for doctrines of future employment of military power. Existing military capability could then be reviewed and transformed to operationalize future doctrines. Modern technology could be used to bridge the gap between existing capabilities and desired capabilities. This in essence would be the doctrinal based approach to transformation.

Political and military leaders would do well to remember the one overwhelming lesson of World War II and Vietnam, that in the final analysis, wars are won by superior doctrine rather than superior technology.

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<sup>i</sup> Water Scarcity in West Asia – Indicators of Unsustainability >[www.cnice.org/pop/pai/water-16.html](http://www.cnice.org/pop/pai/water-16.html)<

| Country      | Water Withdrawal as a Percentage of Renewable Supplies, late 1980s | Years Required for Population to Double at the Current Rate of Natural Increase |
|--------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Libya        | 374%                                                               | 20.4 yrs                                                                        |
| Qatar        | 174%                                                               | 33.0 yrs                                                                        |
| UAE          | 140%                                                               | 24.8 yrs                                                                        |
| Yemen        | 135%                                                               | 21.7 yrs                                                                        |
| Jordan       | 110%                                                               | 19.3 yrs                                                                        |
| Israel       | 110%                                                               | 46.2 yrs                                                                        |
| Saudi Arabia | 106%                                                               | 21.7 yrs                                                                        |
| Kuwait       | > 100%                                                             | 23.1 yrs                                                                        |
| Bahrain      | > 100%                                                             | 28.9 yrs                                                                        |

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