



## **TRANSFORMATION TRENDS—17 FEBRUARY ISSUE**

*“In an age when terrorists move information at the speed of an email, money at the speed of a wire transfer, and people at the speed of a commercial jetliner, the Defense Department is bogged down in the micromanagement and bureaucratic processes of the industrial age -- not the information age. We are working to promote a culture in the Defense Department that rewards unconventional thinking—a climate where people have freedom and flexibility to take risks and try new things.”*

**Defense Secretary Donald Rumsfeld**

### **SPEECH BY VADM ARTHUR CEBROWSKI TO THE NETWORK CENTRIC WARFARE 2003 CONFERENCE 22 January 2003**

**While my title is director of force transformation, the real directors of transformation are the president and the secretary of defense. It is appropriate that they are the directors of transformation because they have elevated transformation to the level of national strategy, national military strategy, corporate strategy and risk management strategy. That places the burden on us to look at transformation through all of those lenses.**

**When we think about transformation we divide it into three distinct areas. Transformation of the role of defense in society; transformation of the management of defense; and force transformation.**

**For the last 50 years or so, the military has focused on state vs. state wars. But the world is changing. We are finding that power is moving to the larger system level (instead of merely at the state level) while violence is moving downwards to the individual level. One of the things to keep in mind is that a military will morph or change or transform in some way to mirror the target set. As the target set moves down to a lower level, it means that the U.S. military will also have to downshift. This is a different way of thinking for us because for a very long time we focused at the top—great power war in a global systems context. But then when the great power war threat went away we focused on rogue states. The result is that we have now something that can be called a governance gap.**



**Here's another way of looking at this governance gap. In the period of time before 1990, we were concerned about balancing our global interests with homeland security. We balanced it on the fulcrum of mutually assured destruction and containment. It worked well vs. the Russians, but what it yielded was surrogate wars. We lived a useful fiction that depicted all surrogate wars as really lesser included cases, which of course they weren't. But it worked. It was good enough given the types of forces we had and the era in which we were in—namely industrialization. With the fall of the Berlin Wall, we took about a 10-year holiday. Now we are rebalancing our concerns.**

**There is a compelling need to transform the military. There was a lot of discussion last year about definitions. I don't really care what definition you use so long as it contains certain elements. Transformation is indeed a continuing process. But we are more about creating or at least anticipating the future. This is not just about technology. It is about human behavior so we are interested in concepts of organizations as well as how they interact with each other. We are talking about creating a new competitive space. We have done this in the past and it has been highly successful. Several years ago people decided that we could compete on the basis of precise navigation and location, it's now called GPS, but it changed our military, changed the nation and changed the world. What happens when you do things like this is the underlying principals change and new sources of power are identified and tapped.**

**The compelling need to transform stems from a strategic context and that is the transition from the industrial age to the information age. It is that networking phenomenon and its consequences, which is increasingly a source of power and a source of change. If we fall behind in that, if we cease to continue to leverage it, then we give up an enormous advantage. The threat base is expanding. Of course we have to consider traditional threats, but newer ones are appearing. One of the interesting things is that almost all of our doctrine is based on the concept of centers of gravity. But if you have a non-nodal enemy it becomes increasingly difficult to identify centers of gravity. And the big change for technology is the worldwide availability of very low cost, very high quality IT. I don't think that is necessarily bad, but one of the things it does do, unfortunately, is that it lowers the barriers to competition. We have to find ways to deal with that. I am particularly concerned about the cyber-domain, space and the sea. Essentially these are the three large commons that we use, and to varying degrees support our economic efforts.**

**In signing out the Quadrennial Defense Review in Sept. 2001, Secretary Rumsfeld in effect created the vision for transformation. It contains the six transformation pillars, but one of these that was passed over by many people is profoundly important, and that is the concept of deterring forward. Being able to deter an enemy and defeat an enemy with minimal reinforcement is going to cause some changes. In general, in peacetime we assure allies, we dissuade competition, and we deter hostile acts. When we have a problem we can then bring forces to bear to compel a resolution. The relationship between our**



**intensity/capability and what is indeed required for success is a measure of our risk or comfort. This is normal industrial age thinking. In the information age, however, warfare becomes path dependent. Small changes in initial conditions result in enormous changes in outcome.**

**That is why we have all of the discussions today about Effects Based Operations. EBO is all about how you do lock-in and lockout. EBO is a spin-off from Network Centric Warfare. Without the network structure and the entire phenomenon that goes on in network centric operations, you don't get to Effects Based Operations. What are we trying to do here now with Deter Forward? What we want to be able to do is develop very rapid rates of change. How do you increase the slope and increase it very quickly?**

**Only certain kinds of forces are going to be able to do that. They are of increasing value. Right now the U.S. military has a large amount of sustaining forces. That is those forces that are capable of generating a peak. There are a somewhat smaller number of forces that are capable of developing very high rates of change to alter the initial conditions. We call that the 2<sup>nd</sup> Derivative Force. They have certain assets or attributes and we can see what is of value in them. They tend to be oriented around speed. Speed of deployment, speed of organization, speed of employment, and speed of sustainment. But the big enabler of this speed is the networking capability. The entry fee for the 2<sup>nd</sup> Derivative Force is a network structure, network centric organizations and network centric warfare.**

**Let's look at networking. We have a mountain of evidence now, from simulation, experimentation and the real world, which verify this. It is becoming increasingly difficult to dispute this. This is about human behavior. Remember that to network is a verb. A platform is a noun. So when we shift from being platform centric to network centric we shift from focusing on things to focusing on behavior or action. That is where we find the power. And when you rack and stack all of that what we are really talking about is a new theory of war because we are talking about new sources of power. The United States Air Force talks about being able to destroy a target using only one bomb where it used to take 1,000 bombs. If you look at the difference between the 1,000 and the one and how it is done the only difference is the IT. You have a 1,000 to one substitution of information for mass.**

**That is the trend line on which we are on. It would be extraordinarily difficult to reverse that trend. I cannot picture an event that would cause us to change direction. If you want to increase the richness of your information you get that by sharing it. The power of information comes in the ability to share it as opposed to the ability to hoard it.**

**Now we are not doing this very well right now. We actually do some things like this now, but they are ad hoc, we don't train for them, we don't have any joint structures at this level of war and when we do it, its always a wonderful thing, but then the people get orders to**



**other places and the lessons are lost and it is simply not institutionalized. We have to fix that and there are impediments out there.**

**There is an educational hurdle that we all have to surmount. The soldier on the front line is the one who needs to be supported. He needs a network structure and he has to be shown that power comes out of that network structure. But he has good reason to complain. Our information architectures are arranged in a hierarchical fashion. They tend to be very, very brittle, but what bothers me most is that the people at the bottom are those who are in mortal danger and they are the least well connected. We have a big last mile interoperability problem and we have got to solve it. We have a moral obligation to solve it because those are the people being put in mortal danger. People at the operational level of war are not warriors—their staff. It is good to support that staff, because they are important to the whole operation, but not at the expense of the folks who are in mortal danger. We have to fix that.**

**You can have a hierarchical structure and still have a very dynamic networking structure, which is far less vulnerable and the people at the bottom are very well connected. This is what peer-to-peer and power-to-the-edges is all about and that is where combat power is really developed. We have to institutionalize this. We have to have standing joint structures that make this happen so it is no longer ad hoc. I don't care if you start with the joint structures first, or the training first or start with the information architecture first, but we have to get to a dynamic networking structure. The key is getting power to the edge in the robustness that we need. If we do that well we find that we step out of the information domain of merely networking and into the cognitive domain where battles are truly won or lost. The seams are very important. The overlap between the information domain and the cognitive domain is where shared awareness must go on and that is an enormously powerful. The precision force is really created at the intersection of the information domain and the physical domain.**

**Six years ago Joint Vision came out and said we will fight first for information superiority, but a lot of work remains to be done with regard to making the organizational changes that are going to bring that to life. Networking alone is not going to do it. We don't yet have a very good understanding of what the elements of information superiority are and how we trade them off against each other, where they show up in the war plans, and who does it. This work simply has to be done. It should be done in advance, because we are going to do it anyway so why do it on the fly every time we have a fracas.**

**In the physical domain one of our biggest concerns is correcting what we call tactical instability. That is when power or lethality increases disproportionately to survivability. This is very common in the physical domain. It causes the development of a risk adverse force. For example, this is what made it difficult for Task Force Hawk to get into Kosovo, to make airplanes fly below 18,000 feet in the**



daytime. We have to work with this risk adverse phenomena. It turns out that there are excellent IT tools that can help us with that. We have to reach for them and change the force. We are starting to do that.

Lastly, and perhaps most importantly, there needs to be an emphasis on the cognitive domain. A key thing to keep in mind in the cognitive domain is that as we work the richness/reach phenomenon, behavior changes in a way in which the enemy simply can't cope. A prime example is in air-to-air. Networked fighters outperform non-networked fighters. We have several thousand runs on this that support it over and over. The key is the information sharing, which the networking makes possible. New tactics are possible. Tactics, which you could only do with extraordinary risk beforehand, you can now do routinely. That is why the networked force wins. We see this at sea, we see this in the air and we see it on the ground over and over again. This is a very exciting phenomenon.

When we put this all together we see that a new American way of war is emerging. We have teased this out, not only from our own observations, but also from the service transformation roadmaps. They recognize the value of shared awareness and that a dispersed force is key to generating the non-contiguous battle space, which will be so important in future warfare. They understand the substitution of information for mass and that this demassification will have a ripple effect across the entire rest of the organization. If the United States Army is in fact going to reduce its logistics footprint by 50 percent, it is not going to do it by doing what it currently does faster. You have to do something decidedly different and that thing that is different is the substitution of information for mass. Organizational structures are going to change and process lines are going to be erased. A lot of lines have to disappear off the map and off the organizational charts.

This leads to an emerging American way of war and an emerging American military that will be more expeditionary, that can operate without an existing forward infrastructure. So some of the issues then are we going to create a forward infrastructure, are we going to carry it with us or are we going to have forces that are just generally less dependent on infrastructure? The answer is yes to all of those things.

The force is going to be vastly more networked than it is now, but we have to put some direction on that. We are going to leverage our external position, and sensors are going to move in closer. The fraction of the force that is dedicated to C4ISR is increasing. There is a lot of concern on shortening sensor-to-shooter timelines. If I look at the data from Kosovo compared to Afghanistan I see that the time to sense was cut down a lot—more than half. The big area of concern is command and control delay time. A general rule is the more vertical communications you have the greater is your command and control delay time. Former Army Gen. Robert Scales used to say for every vertical echelon that information has to go through add eight minutes in each direction for time delay. So if your son or



**daughter is out on point and asking for supporting fires that is unsatisfactory, and that is just one layer. We have to fix that.**

**Peer-to-peer communication places value on information superiority. You see all of the services creating organizations and creating specialized forces to deal with this. We have to move from integrated systems to networking of components and this also applies to aircraft. Weapons reach is wonderful, we can now put a weapon on Mars, but there is not a lot of value in that. The problem is that we control our weapons reach, but the enemy controls our sensor reach. The war is now over sensors. Sensors are a growth business. There is no doubt in my mind. We need to accelerate the networking of the joint force and by that we also mean getting it down to the tactical level of war and extending it out to agencies, allies and coalition partners.**

**A lot of hard working people are already working very hard. They know they are not doing it as well as they could be and so they work harder at it. But while they are putting their head down and working ever so much harder some of them are missing the point that what they are doing is increasingly irrelevant. We have to help with that.**

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