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Defense Issues: Volume 10, Number 47-- Information Operations: The Fifth Dimension of Warfare
Those with the computing power and corresponding speed of information flow have a tremendous advantage on the battlefield. Throughout history, whoever analyzed and acted faster, won.

Volume 10, Number 47

Information Operations: The Fifth Dimension of Warfare

Remarks as delivered by Gen. Ronald R. Fogleman, Air Force chief of staff, to the Armed Forces Communications-Electronics Association, Washington, April 25, 1995.

Thank you for that warm welcome. It's a pleasure to be here. This is an organization that enjoys a strong reputation -- not only here, but across our nation where we have military forces who need the support and expertise of people who understand communications and electronics.

One thing that is no secret is the importance of information, ... to industry, to our joint war-fighting team and to our national leadership. The technology information explosion in our society has created an awareness of the power of information. But that is nothing new to this audience. So rather than tell you something you already know, I'd like to take this opportunity to share my thoughts with you, as a historian, on the role that information has come to play in the evolution of warfare and where we're headed.

If you use as your starting point the beginning of the 20th century, you recognize that war has been fought in two dimensions -- on land and at sea. Then, with the airplane, warfare took on a third, vertical dimension. Air combat came into its own during the Second World War, when airmen, for the first time, struck directly at the adversary's homeland. In fact, our air forces opened a second front when the threat and conditions would not allow any other type of action.

I think the next major advance came in the Space Age. This is the fourth dimension of warfare. And I think Desert Storm left no doubt to people that routine and reliable use of space forces enable our national security forces. I realize that many present helped make the vision of space operations a reality for our joint war-fighter team.

I will also tell you that this information explosion I mentioned signals that we're crossing a new frontier. Information has an ascending and transcending influence -- for our society and our military forces. As such, I think it is appropriate to call information operations the fifth dimension of warfare. Dominating this information spectrum is going to be critical to military success in the future.

Now, some folks might think that I've spent too much time behind a computer lately. It's not the typical thing you hear from a fighter pilot and air mobility guy. I'll admit I've made my maiden voyages on the Internet. But my thoughts on this matter are based less on my playing on a computer and more on how we have manipulated information in the past as part of the American way of war.

If you go back and look at the Second World War, you can see what I mean. In those days dominating the information spectrum was the domain of cryptographers, the code breakers. And they worked miracles, literally. We owe a lot of our success to what they did.

For instance, right after the Allied landings at Normandy the Luftwaffe tripled the number of fighter aircraft in France. But with the code breakers working on Ultra, we were able to keep track of the Luftwaffe actions. The Allies knew not only when these units deployed, but exactly where they deployed to. As a result, we were able to use an air offensive and strike immediately at the Luftwaffe's airfields, destroying much of the force before it could attack our ground forces.

And Ultra played a similar role in the ground campaign. The Allies knew the German army plans and maneuvering. As a result, when the German 7th Army attempted a counterattack we knew it. We were able to defeat it. And we exploited this information. The British Second Tactical Air Force and Gen. Pete Quesada's Ninth Tactical Air Force descended on the armor formations as they massed on the morning of June 27. This air attack broke up the Nazi advance before it really got started.

Interesting enough, it was later, during November and December, that the Germans gained tactical surprise at the Battle of the Bulge by shutting down the communication lines we had tapped. They had gone to other tactical comm[ication] systems to send messages. And our lack of information played a role in the Germans' success.

These are a couple examples of the role information played for our forces, how it helped leverage our combat forces 50 years ago as we fought to liberate Europe.

If you think about how advanced we were during the Second World War and then think about all the technological developments we've made since then, it leads one to the conclusion that we've got to pay attention to the offensive and defensive aspects of information ops. At the Tehran conference [Winston] Churchill described the Allied efforts to manipulate information before the D-Day invasion. He said, "In wartime, truth is so precious that she should always be attended by a bodyguard of lies." The Allies viewed their strategy for the use of information as comparable to the Trojan Horse. It was the cornerstone of their success.

But during the Second World war we also engaged in controlling the information the enemy got. The Allies understood the other guy's ability to intercept our signals and exploited that. You'll recall how Gen. [George] Patton was part of a disinformation campaign before that Normandy invasion. At the time it was a very rudimentary operation.

The Allies set up a fake Army headquarters and made fake transmissions. As a result, the Nazis ended up with a significant number of troops in the wrong place because they could not believe that Patton would not lead the invasion and that the invasion would not use the shortest distance across the channel. More importantly, the Germans kept forces in the wrong place for several crucial days, allowing us to secure our beachhead.

Sometimes I think many tend to forget the importance of this. But I know its significance is not lost on this crowd.

Today when we think about our use of information, it goes beyond just intercepting data. We also have the world's finest C4I (command, control, communications, computers and intelligence). Having served as a commander at all levels -- from the flight level to CinCTRANS (commander in chief, U.S. Transportation Command), I will tell you that a commander without the proper command and control assets commands nothing except a desk.

You must have the ability to communicate with your forces, and you must have the ability to exchange information with them freely and frequently. Today you've also got to be able to do this on a global basis. It's one thing to have highly technical, sophisticated observation platforms that operate in space, in the atmosphere or operate on the sea. But if you can't use the information in a timely manner, it's wasted.

Our C4I connects Joint STARS [Surveillance and Target Attack Radar System], AWACS [Airborne Warning and Control System], satellites and similar assets to the joint war fighters. These assets are critical and invaluable. With them, we enjoy a degree of global, theater and operational situational awareness that is unique.

As I stand here today and assess our ability to command and communicate with our troops, and our ability to exploit our potential adversary's network, I see systems that are really on the verge of taking off. I think we are on the threshold of a very real electronics and communications technological revolution as we move into the 21st century.

I say this not because the calendar is going to turn from 1999 to 2000. That's an artificial event. I say this because the rate at which this audience is driving technology forward. It is accelerating so quickly. This is fueled, in part, by the fact that computers are doubling in speed every 18 months. Chips are becoming smaller and tremendously more powerful. By the turn of the century a conservative estimate has computers performing a trillion calculations per second.

Those who capture this computing power and the corresponding speed of the information flow are going

to have a tremendous advantage. I don't care where you look in the spectrum of warfare. Throughout history, soldiers, sailors, Marines and airmen have learned one valuable lesson: If you can analyze, act and assess faster than your opponent, you will win!

I think this information explosion is going to allow dramatic changes in how this nation fights. It will allow a commander's vision and view of the battlefield to be shared at the lowest level -- to the flight, to the company, to the ship's bridge. Simultaneously, soldiers, Marines, sailors and airmen on the front lines will see and exploit opportunities as they occur.

What this means is that our joint forces may enjoy what some call dominant battlefield awareness. We may never have a perfect vision of what is happening on the battlefield. We'll know the movement, however, not only of the enemy's forces, but of our units with a degree of confidence that has not been possible since the days of Napoleon.

Why do I say Napoleon? Because as warfare evolved over the years, commanders have been constrained by their ability to visualize their forces. Napoleon's century was a period of time when the size of the battle was shaped by the ability of commanders to physically see and maintain line of sight to their units.

But today and into the future we will have the kind of situational awareness that allows us to operate on a global basis. And looking ahead you can visualize what this technology may allow. I see a future without AWACS aircraft. Space-based systems with downlinks and communications networks may provide the air picture to all who need it. In the process this will free up tankers and airfields.

So we are breaking new ground with many of our initiatives, like the Talon programs. These efforts unite our space, C4I and weapons systems into a more coherent fighting force. It took Gen. Quesada and the Ninth Tactical Air Force two to three days to combine information and combat firepower to do the job they had to do. Today we can synchronize similar forces in hours, if not minutes. With our information operations we will dramatically reduce the time required to detect and to destroy a target.

Just around the corner is the first combat platform designed around this concept -- the F-22. You've probably heard about its stealth, and you've heard about its supercruise capabilities, and possibly you've heard about its tremendous agility. But this aircraft incorporates something else.

The F-22's integrated avionics give the pilot the situational awareness to assess and act faster than an opponent -- even when outnumbered. They have a tremendous simulator down at Lockheed. We are going to have a second one here in Washington by August.

People cannot begin to understand what integrated avionics means until they sit in the cockpit of this aircraft and see it perform. This weapon system, with its combination of stealth and integrated avionics, will correlate data from a variety of sources and put a composite threat picture in front of the pilot. This will allow our pilot to act and assess faster. This digitization isn't a concept -- it's being put into production today!

But as I look at the potential of information ops, I see risks as well as opportunities. As an information-intensive service, we are vulnerable to others exploiting our networks and our data bases. So we must protect these critical assets.

Information security takes on added importance in this new age. This will be true whether we find ourselves engaged with a sophisticated foe or involved in a low-intensity conflict. On the other hand, as we look at our opportunities for offensive information ops, we will be more limited to situations when we face an opponent who has a similar reliance on information. My point is that we run a tremendous risk if we look at information warfare only as a unique American advantage. It is not.

Still, I think the implications are clear. The information age will define the 21st century. It will impact all we do that we do in the services and particularly that we do well in the United States Air Force.

We will need accurate, timely information when we respond with global air mobility forces in a humanitarian crisis. We were working on these things when I left Scott [Air Force Base, Ill.]. On any given day we're flying 140 missions to 40 or 50 countries. The ability to talk directly to those aircraft and to know where they are allows you to control your forces much better. It allows you to divert them, like we had to do about a year ago when we conducted an evacuation of U.S. citizens from Rwanda. Information allows you to do this.

Likewise, we will need accurate, timely information when we seek to control the enemy's airspace. We will need accurate, timely information -- flowing directly to our cockpits, to our fire-support batteries, to our ship's bridges -- when we strike with precision across a theater. As such, information will leverage all we do.

As impressed as I am with the promise of new technology, of new hardware -- I will tell you that I am more impressed with what makes this capability work -- our people. As I look across this crowd, I'm reminded that, like the Air Force, the capability that this organization brings to our nation's defense comes from a mosaic -- a mosaic of people with a variety of capabilities and a variety of expertise.

Our Air Force of today and tomorrow needs people who wear aircrew badges, medical badges, missile badges, comm badges and some who wear no badges. But I will tell you that no single group is more important than another. They are all important to what we do. As an Air Force, as a Navy, as an Army, as a Marine Corps, we've got to include industry as partners on our team.

I will tell you that Secretary [of the Air Force Sheila] Widnall and I view industry as full partners on the Air Force team. This isn't a new notion, though. I'm reminded how Gen. [Henry] "Hap" Arnold defined air power. Based on his experiences in the Second World War, Hap said, "Air power is not made up of airplanes alone. Air power is a composite of aircrews, maintainers, suppliers, and industry."

I like that description. It reminds me of what I've personally learned in the past -- that given freedom to

go do what they must, American industry has the insights and skills needed to get the job done. Industry's talent and its expertise ... [are] critical, in my view, if we are to successfully dominate the information spectrum, what I've called today the fifth dimension of warfare.

To do this we must build a foundation of trust and teamwork. We must have a shared confidence with industry. Your commercial and civil ventures give you a tremendous knowledge base. You don't need us telling you how to build a better mouse trap, a better computer or a better spacecraft. So what we are going to do across all our procurement programs is tell you what we need and let you figure out how best to build it.

In the past this nation succeeded when we approached industry in a cooperative manner. That played a crucial part with our success with Ultra in World War II. In the future we need this same basis of trust and teamwork. That's the right approach, not just for the Air Force, but for the armed forces and our nation.

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