Leadership and High Technology

Brig Gen Stuart R. Boyd

In August of 1940, just a few months after the German army had swept through France and introduced the world to the power of a mechanized advance, the US Army began large-scale training maneuvers in Louisiana. In the face of the success of the German blitzkrieg, you might have expected to see our forces searching out new ways to counter the threat of tank and technology. Such was not the case. As the forces gathered, a serious logistics problem soon developed. There were not enough horses to go around. As we approached the dawn of the Second World War, we still clung to the thrill of the cavalry charge. Technology was not yet an integral part of our military force. Gen George S. Patton, a staunch advocate of the horse cavalry, wrote in 1926, "It is the cold glitter in the attacker's eye, not the point of the questing bayonet, that breaks the line. It is the fierce determination of the drive to close with the enemy, not the mechanical perfection of the tank, that conquers the trench. It is the cataclysmic ecstasy of conflict in the flier, not the perfection of his machine gun that drops the enemy in flaming ruin."

History is full of examples of reluctance to adjust to change, especially changes associated with the introduction of new technologies. The French at the Battle of Crécy spent the flower of their knighthood against the power of the English longbow. Millions fell before the machine gun in World War I. Even Henry Ford, "Father of the Model T," was reluctant to introduce colors other than black or the six-cylinder engine. Change is a key factor in effective leadership. New technology, however, has a greater impact than simply the process of change that occurs inside an organization.

The importance of "high tech" to today's decision maker has never been greater. Significant portions of our defense dollar are spent on research and development, although some argue that such expenditures remain inadequate to meet the challenge. Weapon systems grow more complicated and expensive at an ever-accelerating rate. Today's F-6C has more than 10 times the computer capacity of the lunar landing module that carried man to the surface of the moon only a short 15 years ago. As new technologies evolve, we need to decide how we, as military leaders, are to interact with this technical explosion. That is the purpose of this paper, to explore some ideas concerning the relationship between leadership and technology. Let's start with a definition of technology.

In the broadest sense, *technology* refers to any enhancement of human ability to move faster, shout louder, hit harder, see sharper, calculate faster, or whatever. Technology and weaponry have always been intimately connected. I believe it was George Bernard Shaw who pointed out that man's genius is best observed, not in his housing or clothing, but in his weapons. Weapons have always been needed to ensure our security and, in some cases, our survival. Maintenance of security is a responsibility that is assigned to the military—thus, military leaders will always have to deal with the technology that is embodied in the new weapons that they are provided.

The essential elements of military leadership do not change. There are many definitions, but this one by Gen E. M. Flanagan Jr., writing in *Army* (April 1988), seems to capture most of the critical elements: "Leadership in the Army, simply stated, is the ability to get a unit to accomplish a given mission efficiently (of time, resources, casualties) and willingly, or at least cooperatively." Although the essential elements of military leadership never change, technology, an essential instrument of mission success, is in constant flux. The challenge for the military leader is to recognize and use whatever technology is available; to dominate that technology, not to be dominated by it.

The problem is not technology per se; it is the adaptive process of the leader to technology that is the issue. We have had to adapt to the longbow, the tank, the airplane, and now the challenges and opportunities of outer space. Your role as a military leader is to integrate the technologies of today into the accomplishment of your mission—be it peace or war. At the same time, you must be ready to work with the rapidly evolving technologies of the future.

Let us now focus on some of the characteristics of high technology. We frequently concentrate on the wonderful things to be gained by new technologies. However, the introduction of new developments also causes problems. In this

Brig Gen Stuart R. Boyd is commandant of the Air Force Institute of Technology and commandant of the Defense Institute of Security Assistance Management, Wright-Patterson AFB, Ohio. He earned his BS degree from the US Air Force Academy, and an MA degree in business administration from Golden Gate University. He is a command pilot with more than 4,500 flying hours in fighter and trainer aircraft. He flew 107 combat missions in Southeast Asia. After graduating from the Industrial College of the Armed Forces he was assigned as director of projects in the F-16 Program Office. He was also a member of the F-16 Multinational Fighter Program management team supporting the five-country partnership of Belgium, Denmark, Norway, the Netherlands, and the United States.

This article was prepared especially for AU-24, *Concepts for Air Force Leadership.*

regard, this portion of the paper could be aptly titled, "potholes on the road to the successful integration of leadership and technology."

1. Just load the data and the computer will give you the answer. Many of you will recall the movie *War Games*. In this movie a bright young teenager hacks his way into a mythical computer system housed at NORAD and almost starts World War III. The final scenes are filmed in the command post where a number of senior officers are staring at the electronically generated battle, helpless to deal with the runaway computer that is bent on "winning the game." Though the fiction of the situation is absurd, the idea of an electronic system isolated from any human intervention is real. When dealing with high technology there can be a tendency to become isolated from the reality of the situation. I recently saw an advertisement for a computer to be used to assist the ground planner in the NATO environment. The advertisement emphasized the idea that the maximum use of symbols was a strong selling point since it allowed the decision maker to "avoid the need for person-to-person communication in a difficult multilingual environment." High tech can be impersonal.

2. With a computer you get all the information you want—immediately. In the classic military battles speed was often critical. The speed of the fastest horse decided many engagements. Now we have systems that instantly provide the logistic planner the location and status of every part of the F-16 or B-1. Technology can provide real-time information—regardless of the accuracy of the data loaded. Traditional methods of staffing, though sometimes bureaucratic and frustrating, provided time to check data before they went to the decision maker. With the introduction of applications of expert systems using artificial intelligence, we will see this tendency to rely on the computer increase. A computer can provide lots of incorrect information very rapidly.

3. It must be correct, it's computed to the 10th decimal place. High technology provides an impression of precision. Who can argue with the reams of computer printouts being generated by high-speed laser printer from a mainframe computer supported by banks of tape drives? When I attended Squadron Officer School we had to complete a staff study. The format included sections that identified assumptions as well as data sources. This permitted the logic of the decision process to be clarified for the reader. Such an approach, however, is not available when using many of our current technologies. We now rely on software, developed by someone else, for which we couldn't read the code even if it were available. How many people, even if they are comfortable with computers, spend time "studying" the documentation? The precision of a computer answer may lure you into a false sense of security. I can recall struggling with a french curve trying to find a "fit" for some very scattered data points. Since the rules said the raw data had to be plotted, the world would know how I arrived at my conclusions. In today's world, the computer does all of that for you and draws a nice, smooth, multicolored graph—all at the speed of light.

4. I really don't understand these new technologies and techniques, but I don't want to look stupid. High tech can be intimidating. Because it is complex and mysterious, the senior decision maker is faced with a new set of problems. As previously mentioned, the process can be difficult to understand. The people who do understand the process are probably not on the senior staff since the education needed to work with these new technologies is more available to junior personnel. How will you integrate tools such as marginal analysis, effectiveness ratios, or a weighted decision matrix into your decision process? Can you integrate these tools if you do not really understand them? If you look at the history of the eastern front in World War II, there is not a computer programmer in the world who could have given the German army more than three months. The German forces were outnumbered, outgunned, and undersupplied. However, despite their eventual defeat, they conducted a brilliant campaign lasting almost three years. Training and discipline held out for a long period of time against far superior odds.

5. Since technology continues to improve, if you can wait till tomorrow I can promise you a "better" answer. A significant portion of my career has been involved in research and development. One thing I have seen time and time again is the engineer who can always make it just a little better. In peacetime, it is this allure of making "it" more combat effective, even with tight schedules and limited funding that has been the downfall of many programs. In wartime, it can be the "promise" of turning around an impossible tactical situation with "this new miracle weapon to be delivered tomorrow." Tomorrow's leaders must understand the risks associated with searching for the optimum solution.

6. If you want more information, the computer can turn out products as long as you want to ask for them. Tomorrow's leaders will have at their fingertips everything they could possibly want to know about the status of their unit. This information will not be reserved for just the unit commander. Every level of command can look into what is happening at a particular location or in a particular situation. Every dollar expended, every takeoff aborted—everything can be reviewed and questioned. George Orwell's book, *1984*, introduced "big brother," who can look into every aspect of our lives. The technology is now available to make *1984* a reality. A military commander no longer has to leave the office to determine how things are going in the tire shop or whether bombing scores are getting better or worse. As a commander, what will you do when you call up a computer screen that shows nobody ate liver at the dining hall last evening! How are the leaders of tomorrow going to use the vast amount of information they will have at their fingertips? How do you, as a leader, operate in an environment of "total information"?

In wartime, the problems can become even more complex. Numerous sensors feeding back to a central data bank can provide a myriad of information to the commander. Even the pilot can become saturated with dozens of inputs requiring

rapid decisions. The wartime implications of total information are even more challenging than those of peacetime.

7. Instant communication is here today. During several recent military operations, technology provided the capability to communicate with forces actually engaged in combat. Was this more effective than the earlier methods of indirect, delayed communications? One of the reasons for the German defeat at Stalingrad is attributed to the attempts by Hitler to direct the battle from the bunker in Berlin. The role of future communications is critical. The capability to direct an F-16 squadron halfway round the world is real. Modern communications systems allow us to make a decision immediately. Sometimes an "instant" decision may not be wise—the situation may change or the weather worsen. Rapid communications can pressure a leader into furnishing "an answer" even if such an answer could and should wait.

8. Technology is a tool—but it cannot consider everything—especially such intangibles as discipline, motivation, and so forth. This last pothole can be the most dangerous. Some of the best military decisions have been based on what a leader "felt" was the best course of action. For all the controversy surrounding General MacArthur, the Inchon landing was a masterpiece of military strategy. Almost everyone said it should not be done. The bay was too shallow, the tides too high—everyone, including the Joint Chiefs of Staff (JCS), had a reason it would fail. In the past, leadership was developed in field exercises where the smell of dust and sweat was part of the learning experience. Leaders learned to "feel" the right way to go and how to best motivate their troops depending on the situation. Today, we are moving more and more to the world of computer war gaming. After you make your "decision" the computer will make the calculations and tell you whether you are an "effective" leader or not. In such computerized training, how does tomorrow's leader learn to develop "gut sense" that has led to many of the great decisions of the past?

At this point, you may be wondering how you can get down the road at all since it is so full of potholes. Let me offer a few suggestions to avoid some of the deeper ones.

1. Develop a concept of *inner tennis.* One of the current sports fads is to focus on a key element of an activity in a "mind-over-matter" mode. You "picture" yourself as a great skier or a par golfer. In tennis, you discipline yourself to always keep your eye on the ball. In the case of being able to function effectively in the world of high technology, the same technique can be used. Keep your eye on the objective. Don't drive off the road because of the potholes. Not matter how seductive the technology, don't lose sight of your organizational goals. Practice inner tennis.

2. Use a "technology telescope." A telescope allows you to search ahead and better define where you are headed. It makes things clearer. Today's technology can be used to provide tools not available five years ago. Find out what tools can be used and integrate them into your organization. Depending on the uniqueness of your organization, one set of tools will not work for everyone.

3. Understand what technology can and can't do for you. Technology changes rapidly. You are not going to be able to keep up unless you make an effort. The importance of education to both you and your unit will continue to grow. My education focused on slide rules and vacuum tubes. Without periodic updates you cannot expect to be capable of making prudent decisions. Technology comes loaded with all sorts of seductive charms. If you don't take the time to understand the underlying principles, you just might fall in love with the slick allure of all those high-tech bells and whistles.

4. Technology is a micromanager's dream—don't get caught in the trap. These new technologies provide an opportunity to drive a staff crazy with dozens of questions, all developed by paging through your computer screens, and all delivered by electronic mail. Centralized management and information saturation can result in an organizational self-destruct. Tomorrow's leaders must discipline themselves to stay out of this mode. They must also establish an environment that does not force their staffs to operate in this mode.

Technology will tend to drive you away from your people. Don't forget the basic adage: the effective leader spends at least 25 percent of his/her time "out with the troops." The need to discipline yourself to be in the organization is more difficult in an information-rich, rapid-communications world. The military histories of tomorrow are not going to focus on who wrote the most vivid electronic message. Your most critical resource is people. You must gain their confidence, stimulate their productivity, and reward their accomplishments. The only way this can be done is to get out from behind your computer terminal.

Where then do you fit into this environment of technology? More importantly, what are you going to do to better adapt your leadership strengths and weaknesses to the changes ahead? As a leader, you will be expected to understand and shape the technologies you are using to meet mission requirements. No matter what kind of organization you are with—from fighter squadron to system program office—there are tools here that can improve productivity and develop a happier, harder working unit.

This paper has discussed a number of potential problem areas associated with high tech. The list is longer. You and your staff could spend some valuable time exploring this area and deciding how you will avoid some of the potholes.

I have also shared a few ideas on things that will make the process easier and more effective. Keep in mind that we are currently experiencing major funding reductions. The old days of "doing more with less" are gone. The new days of "working smarter" are here. I challenge you to get on board; high tech can save you—or sink you.