Researchers are currently developing the Human-interest Image Detector, a passive brain monitoring system that attempts to detect operator interest in visual scenes. (U.S. Army photo)

Modernizing Soldier Lethality

By Kimball Johnson

"Modernization" is a concept older than the invention of repeating rifles and revolvers. Its definition includes the drive to conduct research and field new technology designed to defend the lives of Soldiers and overcome threats on and off the battlefield.

With modernization comes the underlying temptation to wonder if future technological advancements in offensive capabilities by Army scientists could potentially replace Soldiers in the field. Noncommissioned officers, however, have enough experience with new gear to know technology can never replace the human factor. Imparting hard-won wisdom to their Soldiers, as well as lessons learned from fielding new equipment, will remain the NCO's role.

The Army Research Laboratory's Goals

Ryan D. McCarthy, the undersecretary of the Army, recently defined Army modernization as a six-part goal towards technological superiority in equipment and Soldier lethality.

"We set six priorities: long-range precision fires, next-generation combat vehicles, future vertical lift, network communications, air and missile defense, and Soldier lethality, spanning all the fundamentals of shoot, movement, communicate, sustain and protect," McCarthy said.[1]

Center for Adaptive Soldier Technologies

Improving Soldier lethality is an ongoing project at ARL's Center for Adaptive Soldier Technologies, located at Aberdeen Proving Ground, Maryland. Research topics on their website include cybernetics, "Brain Computer Interface," "The Human Interest Detector," and "The Human Variability Project."

Addison Bohannon, a BCI bench scientist, and mathematician with ARL said CAST's purpose is to make new technology adaptable to Soldiers' needs.

"I was thinking of this example: the M-4 buttstock. It took 30 years to come up with a collapsible buttstock, something that's adaptable to the user for different body

A Soldier fires his M4 carbine. Note the collapsible buttstock. (U.S. Army photo by 1st Lt. Ryan DeBooy)

types and different missions," Bohannon said. "This is a mechanical fix that is now adaptable in real time with some manual implementation."[2]

Brain Computer Interface

According to Bohannon, CAST's Brain Computer Interface research aims at improving Soldier lethality.

"Perhaps we have a different mindset. When we think about lethality, in my research group, we don't necessarily think about individual Soldier lethality, but rather, we're thinking about the squad, or the platoon, or the company's effective lethality," he said.

"One of the things we're charged with is thinking about how that team in the future has, not just Soldiers and not just technology, but a network of Soldiers, advanced technology, and also intelligent systems; things like robots, unmanned aerial systems, and sensors that can reason with the information they collect," Bohannon explained.[3]

According to Bohannon, this is BCI's "interaction" part of their research. It is how Soldiers interface with various technologies to execute the mission effectively, making the team as lethal as possible.

The team is only as strong as its weakest link. With the potential for machine intelligence leaving Soldiers at a disadvantage, Bohannon explained how CAST would recognize and capitalize on Soldiers' strengths in real time by monitoring their physical responses to the environment.[4]

According to Brent Lance, former BCI project manager and current acting division chief for Future Soldier Technologies, CAST continues to research supplemental technologies to enhance Soldier performance.

"The first we call HAIL or the Human Artificial-intelligence Image Labeler. In this technology, we have human and computer vision working together to analyze very large sets of image data," Lance said. "The other one is the Human Interest Detector. With this technology, we identify when an individual is looking at something they find interesting."[5]

Lance explained how this technology would increase lethality by sharing what Soldiers see with a central image processing computer which sorts the information. Important images are sent to the team leader for review.

"With something like the Human Interest Detector, we have information [from] multiple Soldiers cueing on the same thing," he explained. "We can deploy an unmanned aerial system to image that thing so it could automatically be brought up on the Blue Force Tracker. That's the way we envision BCI enhancing team performance."[6]

According to Bohannon, this type of "anticipation" increases lethality.

"We see BCI as a way we can passively monitor what a Soldier is interested in or attending to and then use that information to anticipate what the Soldier wants to do," he explained.[7]

Back to Basics

According to Bohannon, the NCO role will not change when BCI becomes operational.

"It's the tools of their craft that are going to change over time" he explained. "We expect NCOs to be the tactical and technical experts of their craft."[8]

Bohannon said CAST needs NCOs to go back to their units and train their Soldiers in new technologies as they become available.

"They're going to be the ones who employ or supervise the employment of these technologies, and they're going to advise officers on how to plan for their employment," Bohannon said.[9]

Conclusion

"The same thing will be true in the future as it is today, and that is, sweat given in training will reduce blood in combat, and that won't change. What will change is we will require more of our Soldiers in the future than we do today," said Sgt. Maj. of the Army Daniel A. Dailey.[10]

ARL scientists aim to increase Soldier lethality to meet modernization goals. However, NCOs remain the basis for the success these new technologies introduce to the battlefield since they have the technical mastery to field it and direct others in its use. ■

Notes

1. Under Secretary of the Army Ryan D. McCarthy in response to interview questions from Master Sgt. Maggie Nelson, February 2018. http://www.armyupress.army.mil/Portals/7/nco-journal/docs/NCO%20Modernization%20Final-1.pdf.

2. Addison Bohannon, mathematician with ARL, Adelphi, MD., in response to interview questions from the author, February 2018.

3. Bohannon, February 2018.

4. Bohannon, February 2018.

5. Brent Lance, acting division chief of Future Soldier Technologies, Adelphi, MD., in response to interview questions from the author, February 2018.

6. Bohannon, February 2018.

7. Bohannon, February 2018.

8. Bohannon, February 2018.

9. Bohannon, February 2018.

10. SMA Daniel A. Dailey in response to interview questions from Master Sgt. Maggie Nelson, February 2018.

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