

EPISODE TWENTY TWO OF "ARMED WITH SCIENCE: RESEARCH APPLICATIONS FOR THE MODERN MILITARY," A DEPARTMENT OF DEFENSE WEBCAST HOST: DR. JOHN OHAB GUESTS: KELLEY HUGHES, STRATEGIC COMMUNICATIONS OFFICER, JOINT NON-LETHAL WEAPONS DIRECTORATE; ALICIA OWSIAK, DEPUTY CHIEF, TECHNOLOGY DIVISION, JOINT NON-LETHAL WEAPONS DIRECTORATE TIME: 2:30 P.M. EDT DATE: WEDNESDAY, JULY 1, 2009

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ANNOUNCER: "Armed with Science: Research and Applications for the Modern Military" is a weekly webcast that discusses cutting-edge science and technology and how they apply to military operations.

Each week we will interview scientists, administrators and operators to educate and inform our listeners about the importance of science and technology to the modern military.

DR. OHAB: Good afternoon, and welcome to Episode 22 of "Armed with Science:" Research and Applications for the Modern Military," on Wednesday, July 1st, 2009. I'm your host, Dr. John Ohab. We're joined today by two members of the Joint Non-Lethal Weapons Directorate, Kelley Hughes, strategic communications officer, and Alicia Owsiak, deputy chief of the Technology Division, are here to discuss non-lethal weapons systems with a range of capabilities across the full spectrum of threats and crises.

We will specifically address optical distracters, essentially visible laser devices, that are currently in use in Iraq and Afghanistan.

Kelley, Alicia, thank you for being here today on "Armed with Science." How are you?

MS. HUGHES: Good afternoon, thank you. We're great.

DR. OHAB: Just a quick note to our listeners: If you have any questions during the show, you can Tweet them in 140 characters or less to @armedwscience, or you can post them on our show page, BlogTalkRadio.com/armedwithscience and we will see about getting those answered for you before the end of the show.

I will address specific questions to each of our guests, but I encourage both of them to interject or add thoughts as we go along.

Kelley, I'll start with you. Would you tell us a little bit about the Joint Non-Lethal Weapons program?

MS. HUGHES: Oh, yes I can, and thanks again for inviting us to be here today.

The Department of Defense Non-Lethal Weapons program has been helping the services identify their non-lethal capability sets since 1996. Our program continues to stimulate technologies to cover those gaps.

And this is why our warfighters need new and more effective tools to meet their warfighting needs in support of their commanders' missions. New and developing capabilities offer increased range, more precise effects, longer duration, and higher operational effectiveness.

Investments continue to support training at the Inter-Service Non-Lethal Individual Weapons Instructor Course to train non-lethal weapons instructors. Non-lethal weapons classes are taught at war colleges and staff colleges. Additionally, we have demonstrations and support are provided to the combatant commands to ensure the tactical and regional engagement requirements are met.

Here locally, the Joint Non-Lethal Weapons Directorate manages the Joint Non-Lethal Weapons program, the day to day operations, and it is based at Quantico, Virginia. The commandant of the Marine Corps serves as the executive agent for the DOD Non-Lethal Weapons Program. DR. OHAB: And, Kelley, the notion of a non-lethal weapon is at the same time intuitive in that it's non-lethal, but a little confusing. Could you give us a working definition of non-lethal weapons?

MS. HUGHES: Sure. The Department of Defense defines non-lethal weapons as weapons, devices, ammunition that are specifically designed and primarily employed to incapacitate targeted personnel or material immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment.

Non-lethal weapons are intended to have reversible effects on personnel and material. The two key attributes are incapacitation and reversibility.

I must also mention that non-lethal weapons fall into two categories. Counter-personnel non-lethal weapons target individuals or groups while counter-material non-lethal weapons target vehicles, vessels or aircraft.

DR. OHAB: Now, we're going to talk, for the most part, about one of these, which is the optical distracter. I was wondering real quick if you could just give a couple of examples off the top of your head about non-lethal weapons that would target an individual or a group versus one that might counter vehicles, vessels or aircrafts.

MS. HUGHES: When we're talking about -- if I could go back to talk about non-lethal weapons -- non-lethal weapons, they give warfighters crucial escalation of force options between shouting and shooting. Once again, they help minimize casualties and collateral damage across a full spectrum of military operations, everything from full-scale combat to humanitarian and disaster relief missions.

This is especially true with dramatic increase in irregular and hybrid warfare, which brings combat into crowded urban areas and villages. Non-lethal weapons also can help warfighters discern intent, discriminate targets and lethally deter potential dangerous individuals.

What I'd like to turn over to Alicia, that perhaps she can talk about our optical distracters; why we have them and perhaps also the safety and how they're employed.

DR. OHAB: And we've heard a lot about U.S. troops using laser dazzlers or optical distracters in Iraq, both from popular news media or social media sources. If you could explain, what are laser dazzlers?

MS. OWSIAK: Laser dazzlers is actually a common name that's come about, really encompassing a broader technology area known as optical distracters. Those green lasers, or laser dazzlers, as they're sometimes referred to, are one type of optical distracter. Optical distracters are non-lethal weapons that provide an escalation-of-force option. These can be used in several different scenarios, one of which where the warfighter can actually shine the laser in an approaching vehicle windshield to hail, warn and even suppress vehicle drivers approaching a checkpoint who may or may not be heeding warning signs.

If the driver is an innocent civilian who just happens to be in the wrong place at the wrong time, this gives them a very clear signal and will likely make them stop. But if that person or that individual keeps coming at full speed toward the checkpoint, the warfighter then knows that the driver likely has malicious intent and the warfighter can escalate force.

DR. OHAB: Now, why specifically are optical distracter, and for that matter non-lethal weapons, so useful in general?

MS. OWSIAK: Well, optical distracters and other non-lethal weapons provide an option in the escalation of force, something between shout and shoot. So when warfighters are faced with a position where they don't know the intent of an individual or a vehicle approaching, this gives them an option to try to warn and determine intent before they escalate to lethal force.

And if I may, I'd like to give you an example.

If you picture a scenario where U.S. troops are manning a vehicle checkpoint, a car is coming toward the checkpoint but the driver doesn't seem to notice or heed any of the signs telling him to slow down or stop. Maybe he just doesn't understand that he needs to stop at that checkpoint. Or maybe he's a suicide bomber on a mission to kill U.S. forces and any innocent civilians who happen to be nearby.

Well, how is the warfighter supposed to determine the driver's intent and take the appropriate actions with only a few seconds to assess the situation and act accordingly? If he has only lethal weapons, he can try to wave the driver down. If the driver doesn't respond, the warfighter can try to shoot his M-16, M-4 at the car's engine block or tires, or at the driver himself.

But what if the driver is just an innocent civilian? Optical distracters, non-lethal weapons, will provide an escalation-of-force option in this situation. The warfighter can shine the laser at the vehicle windshield at extended ranges, causing temporary optical incapacitation to the driver.

If the driver is an innocent civilian who just happens to be in the wrong place at the wrong time, this very clear signal will likely make them stop. If he keeps coming full speed toward the checkpoint, the warfighter then

knows that the driver likely has malicious intentions and the warfighter can escalate his response to handle the threat appropriately.

DR. OHAB: Thank you. Now, Alicia, you're the deputy Technology Division chief at the Joint Non-Lethal Weapons Program. Can you talk about some of the safety concerns that are associated with optical distracters or laser dazzlers? Are they actually safe?

MS. OWSIAK: Yes. All fielded optical distracters have undergone extensive human effects testing to determine at what distances they can be safely operated without causing permanent eye damage.

Optical distracters have what we call an NOHD, or nominal ocular hazard distance. This indicates essentially the minimum distance required for that laser to be safe to the human eye. There has been a lot of testing that's gone on under the Joint Non-Lethal Weapons Program on all non-lethal technologies, but specifically lasers, to characterize, evaluate, review and ensure that they're both operationally suitable and effective. The JNLWP sponsors a number of systems analyses and human effects risk assessments on an as-needed basis per service requirements. So, for laser technologies, this includes characterization of the laser energy on target, identifying the nominal ocular hazard distance, injury risk, range, divergence, et cetera.

But in addition to the safety testing, the Joint Non-Lethal Weapons Program also conducts effectiveness analyses to understand how green lasers and other optical distracters, and really all non-lethal devices, affect individuals in certain scenarios. This gets back to ensuring that technologies are operationally suitable and effective.

The purpose is really to understand the behavioral response of individuals exposed to certain technologies to help guide the development of future system parameters and tactics, techniques and procedures, or TTPs.

DR. OHAB: And what kind of precautions are currently in place to prevent injuries to civilians and U.S. troops?

MS. OWSIAK: Well, right now the Joint Non-Lethal Weapons Program is working with the Joint Services to incorporate engineering safety controls with fielded and emerging optical distracter technologies. This is done to ensure that there's eye safety, even within the NOHD, for example, by automatically adjusting the power based on the distance to target.

Right now, for example, the Green Beam Dazzler III Custom, one of the green lasers the services are currently using, is being retrofitted to include a safety control module that will prevent inadvertent lasing by shutting off the system when the target enters the nominal ocular hazard distance. So once modified, this laser will be referred to as the LA-9/P.

So that's just an example of some of the things that the program and the Joint Services are doing to prevent injuries to civilians and U.S. troops.

DR. OHAB: Can you explain the role of perhaps non-human effects review bodies, like the Human Effects Advisory Panel?

MS. OWSIAK: Yes, the Joint Non-Lethal Weapons Program leverages the unique expertise of several human effects review bodies to provide recommendations on emerging technologies, such as optical distracters.

Some of these include, for example, the Human Effects Advisory Panel. That panel is a non-government blue ribbon panel of subject matter experts. And they convene to make research recommendations on specific topics. For example, in November 2007, a human effects advisory panel was convened to address optical laser devices. Another board which we depend on is the Human Effects Review Board. Unlike the Human Effects Advisory Panel, this is a Joint Service governmental board of medical, safety, legal, treaty and policy experts who review the human effects state of knowledge before program and technologies reach major milestones in the acquisition process.

And finally one other board, specifically with respect to optical distracters and lasers, is the Laser Safety Review Board. The Laser Safety Review Board reviews all Department of the Navy lasers, using combat or combat training and really acts as a source of laser safety guidance for any systems being developed. And each service has a similar laser safety review board.

DR. OHAB: You mentioned the other services. Kelley, how widespread is the use of optical distracters? What military services are currently using them?

MS. HUGHES: Currently both the Marine Corps and the Army has been fielding optical distracters to units in Iraq and Afghanistan, primarily for the use of vehicle checkpoints and convoy operations, to warn individuals approaching security zones.

The Air Force has fielded optical distracters to its security forces for their missions, and the Navy plans to start fielding optical distracters in the near future.

DR. OHAB: Is the Marine Corps responsible for training each of the different services or is that responsibility shared?

MS. HUGHES: Each of the services are responsible to train and equip with their non-lethal weapons.

DR. OHAB: Now, I know there are various measures of success. Kelley, have lasers been successful?

MS. HUGHES: Yes. I can give you an example. The Marine Corps Operating Forces have told the Marine Corp's Center for Lessons Learned that they optical laser distracters have been extremely effective during escalation of force operations to warn personnel at safe distances.

There is also anecdotal reports that suggest that Field Green laser devices have been extremely effective in providing a means for warfighters to engage personnel at significant standoff distances, allowing them to determine the intent of personnel before the warfighter comes in harm's way.

In cases where innocent vehicle drivers misunderstand or misinterpret initial signals and signs to stop or move away from protected assets, using a green laser for an equivocal warning prevents them from further unnecessary escalation for force and saves lives. DR. OHAB: Now, as we wrap things up, is there anything else that you guys would like to add today?

MS. OWSIAK: I don't have anything to add.

MS. HUGHES: Well, I would like to say thank you for having us, and if I could I'd like to share our website for listeners. If they'd like to visit our website I have that for you.

DR. OHAB: Of course.

MS. HUGHES: It's https, as in Sam, colon, www.jnlwp.com. Once again, it's <https://www.jnlwp.com>.

DR. OHAB: Kelley Hughes, strategic communications officer, and Alicia Owsiak, deputy chief of the Technology Division at the Joint Non-Lethal Weapons Program, thank you for taking the time to be here today on "Armed with Science."

MS. HUGHES: Thank you.

MS. OWSIAK: Thank you.

DR. OHAB: Listeners, please tune in next time, Wednesday, July 8th, when we are joined by Dr. Stephen Muza, team leader of the Thermal and Mountain Medicine Division, the U.S. Army Research Institute of Environmental Medicine, who will discuss the impact of high altitude on conducting mountain operations and how the Army is using science to improve warrior health and performance at high altitudes.

Thank you again for listening. I'm Dr. John Ohab, and you've been scienced.

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