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NON-LETHAL WEAPONRY AND NON-PROLIFERATION†

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My name is Jared Silberman, and I work for the Department of the Navy Office for Strategic Systems Programs. You have to understand that my views here tonight do not necessarily reflect the Department of the Navy or the Department of Defense, or even the United States. I cannot bind the Navy, which is why I make this statement.

I grew up across the state line, not too far from here, in Michigan, so it's always a pleasure to come back to the Midwest. I was at a conference about two weeks ago in Washington where one of our speakers, Dale Watson, attended and, although it wasn't Dale who said this, one of the other panelists said that he had never read the *Federalist Papers*, but he was always interested in reading them, so he decided to teach them. For those of us who do teach, there is probably a lot of truth in that. The parallel here is that I actually do get to review international treaties and legal obligations that involve the government, particularly the Navy, in arms control. And in fact, this morning at about seven o'clock, I had my Blackberry with me, and a message came across: would I please look at this for review, so that a potential weapon for use could in fact be used.

Part of my talk today is going to be re-thinking the bomb in a non-lethal way, and the other part of my presentation is nuclear non-proliferation and specifically, the Proliferation Security Initiative, a way that still allows the U.S. to be effective in its defense but still comply with the realities of international arms control.

So, indeed, we're in the nuclear age, but this talk gets us to the non-lethal aspects. Think of it this way: the increased lethality of a weapon is not necessarily the best way to win the mission. Non-lethal weapons are very effective in deterring, coercing, and

† Mr. Silberman was the third speaker at the Symposium on Re-Thinking the Bomb: Nuclear Weapons in the Age of Terrorism hosted by the *Notre Dame Journal of Law, Ethics & Public Policy* on November 9, 2004. See also Dale Watson, Preventing Nuclear Terrorism (Nov. 9, 2004), in 19 NOTRE DAME J.L. ETHICS & PUB. POL'Y 333 (2005); Joseph Cirincione, Proliferation Threats and Solutions (Nov. 9, 2004), in 19 NOTRE DAME J.L. ETHICS & PUB. POL'Y 339 (2005).

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as we speak today, with the battle of Faluja going on, urban operations are a prime example of how we are using non-lethal weapons to the nth degree. One thing that you may see on the horizon is the use of malodorants—a way to deny access to an enemy. And think about it—if you are a soldier in the field, and you don't have to kill someone but you can still complete your mission, you will feel better about it. People don't think about the reaction that comes to the soldiers after the mission, where they have had to kill people. Providing a way not to do that but still be effective in the field may be a blessing in and of itself.

The usual definition of non-lethal weaponry is: weapons explicitly designed and primarily employed to incapacitate personnel or material with minimal fatalities, permanent injury, and undesired damage to property and the environment. We can accomplish the non-functioning of a target without physical destruction. Most of them are intended to have reversible effects, and they affect objects differently.

As I spoke about Faluja, it's not just for the low-contact situations like peacekeeping. You can really use them now on the battlefield. You can use them in the entire scope of military operations, and we are looking at efficiencies here. Preventing collateral damage is the utmost concern to the military. We try to stay within those bounds. When we really want to stabilize or neutralize something, why incur greater wrath from the community by incinerating or by blowing something up if we don't have to do that? This is a new way of thinking—we are in a new age here.

These are what I call some of the "new arrows in the quiver." Going with anti-material or anti-personnel effects, or in some cases both, we can introduce conductive particles in the machinery so they short out. We can disable equipment that way. If something contains polymers we can introduce depolymerization agents. So it is possible with new processes to resolve other battlefield issues. For example the use of liquid metal embrittlement agents are very effective. When I was in law school, I remember the kryptonite bike locks were coming out. And one of the big selling points was that this type of lock would withstand someone from attempting to apply a can of frozen gas sprayed on it and being able to crack the lock. I never saw that demonstrated but this concept is along that same line.

We can use non-nuclear electromagnetic pulses to short out equipment and to effectively take down things. High-powered microwaves can be very effective in a non-lethal setting. Think of non-lethal microwave energy being used to focus crowd movement. Heat waves applied to a crowd from a distance. And what

happens? The crowd just goes away; they can't stand it, and it's similar to heating up your skin, if you put it near a stovetop. It won't hurt you, won't cause a permanent effect, but you'll get out of the way. We have material to cause fuel to congeal, to gel up, so the underlying machinery may be ineffective. A great tool for possible use.

We can use, instead of kinetic bombs or explosives, caustics because, again, we are only interested in neutralizing the site or the equipment. It's not about bringing bodies out; it's about neutralizing whatever is going on in that bunker or site. Super-lubricants, things so slippery that things can't function—you can't drive anything over it. Use of acoustics, may be another non-lethal effective tool. At certain levels use of acoustics could be detrimental to hearing loss, however, if used in a much more tolerable but not acutely detrimental application, may give the military a future non-lethal alternative in meeting the mission's objectives.

This is a type of sticky foam now that is like a sticky glue substance that comes out that literally holds people in their tracks. As with any deployed weapon—non-lethal or otherwise—if it is not employed correctly, there is the possibility that someone could receive injuries greater than expected, however, even a few unintended severe injuries are preferable than anything used previously—if the mission allows it. There is now the possibility of using isotropic radiators to go after personnel, and lasers using non-blinding light flashes. These are all possible non-lethal applications to the battlefield.

Many of these new tools, these “new arrows in the quiver,” come from law enforcement devices that are out there now. It is really the military that is getting a hold of them and running probably a more thorough check for possible compliance with the laws of armed conflict. For example, malodorants were first used by civilian law enforcement personnel to deny access to crack havens. Civilian police would send the malodorant in and the smell would be so intense that no human would want to be in there. This is another likely effective tool for accomplishing “area denial” but still falling within the realm of a non-lethal device.

I mentioned lasers, and we have polymer agents. Remember the Moscow Opera House Siege? The Chechnya group had taken over and what did the Russian Federation forces do to re-take the Opera House? They did this a little incorrectly—they shot Fentanyl, which is a type of anesthetic, and used it in a very high dosage, and they sent it through the HVAC system. So those that were situated around the HVAC vents were more

acutely affected, and as a result of the release of the "gas" approximately 120 people died. The point being here that that someday there could possibly be a new type of weapon on the frontier that we could put people to sleep for a little bit of time, take out the good people or take out the bad people, and accomplish a mission without necessarily killing or causing long-term harm to individuals.

We can't legally use that now because, according to the Chemical Weapons Convention ("CWC"), you cannot employ chemicals as that term is defined, for use against another population. Let me give you another example. Someone once had an idea to develop an infrared signature by backing up a jet engine to a cave or to a bunker, so that it was possible to see where the tunnels led. Great idea. It may have worked, but under the CWC it would not have been legally permissible. In that scenario, you would be discharging exhaust (gas) into the cave, and under the CWC such use would violate the Treaty. We don't fight wars that way.

So I call this "mixing up the battlefield." We have now to determine whether the new applications may be used in the way in which we will fight future battles. Lasers with low energy for temporary distraction and not intended to causing long-range or permanent harm to vision could be very effective. It is believed that civilian authorities apprehended Malvo, the D.C. sniper, with what are termed light-flash grenades. Their use is similar to exiting a dark movie theater in bright light. This use does not cause a permanent harm only a temporary, non-lethal distraction.

There are more non-lethal weapons—I mentioned acoustics. Below fifty megahertz, its use apparently does not cause harm but only a temporary disabling effect, possibly nausea. At a higher frequency, they can cause an anti-material effect. It can cause glass to be broken, similar to the opera singer or from a sonic boom. That's how sound waves affect things, and the use of acoustics might possibly do that. I also mentioned the high-powered microwaves, which are usually anti-material, but the heat effect can actually cause a crowd to move. You cannot stand the heat produced. There is the possibility of future use on the battlefield of sticky foam, capturing nets, polymers causing extremely slippery conditions, and super-lubricants. For example, if you were a hockey player, you would not be able to skate on it because it's super slippery. You cannot dig in, and more importantly, equipment cannot move on it as well. There are the electromagnetic pulse (EMP) transient power surges that are capable of taking out power equipment. Well, the upshot of the

new technology is that there are new arrows for the war fighter to consider for the quiver. Again, these represent new possible ways of fighting wars.

Picture yourself as a sentry. As a vehicle approaches, no matter where you are in the world, you may not know whether there is an approaching family seeking medical help, or someone attacking as a suicide bomber. Yes, the easy thing might be to shoot everything and ask questions later, but now through non-lethal choices there also exist options to deploy nets, which can simply stop these trucks in their tracks from far away. Another option in this type of situation would consider use of the slippery super lubricant mentioned previously. People cannot navigate. It's a great thing to have options for possible use of these tools. Another very interesting new tool is a type of handheld weapon containing two barrels. One barrel is a non-lethal deployment device and the other is lethal. This works with use of a toggle switch—up, down, up, down, up, down. If you think that a soldier in the field cannot master this, you are quite wrong. Our soldiers trained in their youth—as many in the audience have been—with video games. Because of this training, people are now very adept at using newer high tech devices like the toggle switches in deciding whether to go lethal or non-lethal. Again, think of the psychological damage averted if your soldiers do not have to kill people and can achieve their mission by using non-lethal weapons. Consider a net—gladiator style, revisited for modern times—able to stop someone in his or her tracks. Another possible tool is the active denial system, which can be mounted on a Humvee. This device is able to project rays out at a distance and can create a burning sensation upon whom it is aimed. The lesson from these examples: you don't have to kill people and you can control a crowd.

For those of you who play sports—I love sports analogies—remember, you know, the phrase “take a player out.” This occurs when you want to make a play, and the athlete moves in one direction with the expectation that the covering athlete will follow. In essence, taking someone to one area to clear the area. As countries develop and deploy new non-lethal technologies, other countries, to defend themselves, are going to have to do that as well. What we may use may cause other countries to defend in that way, too. That's good—we have the resources to do that, and we can be effective with it, and they can spin their wheels trying to figure this out. So, the countermeasures are not apt to be nuclear or highly explosive conventional weapons. Instead, and hopefully, a new less deadly type of warfare will emerge.

There are concerns in the world that come up whenever any nation deploys either a target drone or some type of device. Defense systems of nation's surface ships need to be tested without actual use of the weapons themselves. How else can reliability be established? Target shots without use of the underlying weapon may also prove to be an effective method for testing.

A new area of rapidly developing technology is the unmanned underwater vehicle ("UUV"). Just as we use aerial drones, the Predator being one example, which permits the United States to not risk its pilots in theater. The UUV might allow a nation to penetrate enemy mine fields and neutralize those mines. There are new challenges, though. International maritime navigation regulations prescribe permissible activities of vessels at sea. What if a mother ship disappears? If a UUV is deployed nations have actual responsibilities concerning these activities. What is new technologically may not allow a country to skirt existing legal parameters and obligations.

Consider robotics? We have seen in all types of applications civilian as well as military, extremely effective results. It is noteworthy, that under the laws of war and the laws of armed conflict, you cannot do remotely what is forbidden by direct means. What does that mean? It means that you cannot send a flurry of whirling dervish robots into a house that cannot recognize a flag of surrender if one is offered. Under the laws of war, we are obligated to accept a white flag or simple truce, so an enemy can in fact surrender if it wanted to. Questions exist as to what level of programming is necessary for compliance with treaty or international obligations. Must unmanned vehicles self-destroy if control is lost? Do navigational protocols apply to the unmanned situation? The world is figuring this all out now.

The U.S. does and must comply with the laws of armed conflict. Three factors still govern. First, any new weapon employed must be used against a lawful military target (i.e., military necessity). Second, suffering must be minimized. One situation in which this factor manifested itself involved a request by the Marines to have a serrated edge on their K-bar or knives. They found out that on some of their missions, tasks such as cutting through Plexiglas would be much easier to accomplish. We actually had to do a legal review on that proposed use of the weapon to see whether the Marines' use of serrated edges on the knives would violate the laws of armed conflict. Again, it is about killing humanely: if you're going to kill, and if it has a serrated edge, the knife might be able to wound in a way that might not be sanctioned and therefore cause unnecessary suffering. Third and

finally, the uses must be proportional—the level of damage must be consistent with military significance.

Another issue that has emerged relates to focusing the conflict. As we become better with new technology and the actual numbers on the battlefield decrease, we can fight wars remotely now. So, for example, in an electromagnetic pulse attack someone in a lab could initiate the attack. The same is true with a microwave attack. Battle armor may not necessarily be needed. Future technological developments could possibly reduce the need for large forces on the ground.

Now, what other factors may be used so that our nuclear numbers are reduced for international treaty compliance? The U.S. Navy is now actively changing four of our older “Boomers,” our SSB’s, specifically the OHIO Class. We are converting the submarines, OHIO, MICHIGAN, FLORIDA, and GEORGIA, to a new class of submarines called the SSGN, or guided missile submarine that will use a non-nuclear or cruise missile to replace a number of the nuclear ballistic missiles. This saves vital resources and, more importantly, it gets us to the numbers needed to comply with international treaties. We are very proud of our Blue and Gold teams and, if you’ve ever seen them, I am sure you share my enthusiasm. It is a tremendous dedication—what these individuals are doing on our submarines. As Commander Robert Aronson has said previously, this will give a “second career” to the Boomer Force in unanticipated ways.

Let me step back a bit now, and show you other examples of what the U.S. has done to reduce nuclear proliferation. What the present administration is doing, starting approximately two years ago, is the issuance of a Proliferation Security Initiative (PSI). That is not a treaty in and of itself, but serves as a basis for countries to work together. To date, thirty-four countries have embraced it, and approximately sixty countries are in favor of it in some general way. The goal of the PSI is to facilitate practical cooperation among nation-states for reducing a rogue state’s ability to procure weapons of mass destruction, including nuclear weapons. This Initiative is going after the bad guys—you’re right, the stuff is still out there and no one is suggesting that a new treaty is in effect yet, but this is a way for nations to work as a coalition, an effective coalition that if necessary can go after the bad actors in the world. How will the nations cooperating in this Initiative focus their efforts? They’re going to focus on shippers, receivers, and, interestingly enough, their insurers, as well. Going after the money ensuring delivery of these weapons may prove a very effective tool for stopping the trade. Remember, about one year ago, North Korea was thinking of supplying Nige-

ria with some type of missile device. If North Korea had done that, they would have been in violation of that agreement. Historians remind me it took a precipitating event like Fort Sumter to actually start the U.S. Civil War. Similarly, if North Korea had actually gone through with its initial intentions one could argue that the stage might have been set for some major conflict.

So, what lies in the future for the PSI? In the past year alone, there have been ten exercises. For example, Sea Sabre was a U.S.-led maritime exercise conducted in the Arabian Sea; Air Brake, an Italian-led air interception exercise conducted over Italy in February; Operation Hawkeye, a German-led customs exercise conducted in Frankfurt; Clever Sentinel, an Italian-led maritime interdiction exercise, so that the portrayed bad actors were interdicted on the high seas as they made the shipping-transport approach; Safe Borders, a Polish-led ground interdiction exercise last April; and Operation APSE, a France-led simulated air-interception exercise that took place in June. Additionally, there was a workshop held in Denmark that coached a shipping-container security workshop that included private industry. This is the future of PSI. It is a workable way to get nations working together in a cooperative effort, a really workable coalition that can stop some of these rogue nations from causing devastation.

Thank you very much.