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NON-LETHAL WEAPONS AND THE FUTURE OF WAR

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MASTER

NON-LETHAL WEAPONS AND THE FUTURE OF WAR

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Introduction

Good evening and thank you for inviting me to address this ongoing seminar on the future of war. As some of you know, this is an area I have given a great deal of thought over the past few years. Tonight, I will present some ideas that run counter to conventional defense and the notion of overwhelming force. I will advocate the development of nonlethal weapons on a scale that is greatly increased over current programs. (slide 1. Title)

There are several caveats I need to make before addressing the need for nonlethal weapons and concepts.

1. Lethal force.

There are a number of bad actors in the world. For threats such as Iran, Iraq, and other nation-states that can act against our national interests, we need a highly mobile, extremely lethal force. Nothing I say tonight should infer I would degrade that capability.

2. Troop safety.

Maintaining the safety of U.S. forces is a paramount issue. Again, nothing I say should be construed to infer that I would advocate unnecessarily putting our troops in harms way. There is no way that law-makers or the American public would tolerate increased risk to our servicemen and women in order to reduce an adversary's, or even collateral casualties.

3. Limits.

Nothing is perfect. There are no systems that are totally safe under all conditions. I opine, that if the U.S. is going to apply force at a national level, a natural consequence will be some loss of life, no matter how hard we try to avoid it. Nothing is absolutely nonlethal under all circumstances.

4. Physical injury.

In no way am I advocating maiming weapons, such as systems designed to intentionally blind humans. They are illegal under the rules of war, and in my estimation, would be unacceptable to most Americans.

Definition

(Slide 2) This is my overview slide. It addresses many of the key issues, ones on which I will expand. The main points are:

- Not intentionally crossing the "Death Barrier," a term coined by GEN "Shy" Meyer
- Focus on antimateriel systems
- Expanding options for commanders
- A broad range of applicability
- Some of the generic technology areas

(Slide 3) Semantics are important. Many different words have been attached to the concept of minimizing casualties. Some include soft kill, mission kill, disabling technologies, low collateral damage, and less-than-lethal force. None are perfect. I have chosen to use "nonlethal" because it has an emotional hook. It also has severe drawbacks as it can create unobtainable expectations. Please note that I am talking about goals, not absolutes.

Why Nonlethal Options?

(Slide 4) Why are we addressing nonlethal options at this time? There are several reasons. When I first started talking about nonlethal weapons, the world was very different. Our focus was on war in Central Europe. To fight that war, we had developed the Follow-on Forces Attack (FOFA) and Deep Attack concepts, designed to break Threat tempo so that we could handle the target servicing rate at the Forward Line of Troops (FLOT). In short, there were too many tanks, arriving too quickly, for us to stop them with conventional weapons at the front lines. We had to have the ability to reach deep and disrupt the Soviet ability to massively reinforce. At first, the nonlethal weapons we examined were considered to temporarily delay the arrival of fresh units. We were considering nonlethal barriers that might be easier to deliver to an area, as opposed to the requirement to hit a specific piece of hardware. The

delays, it was postulated, would have a cascading effect, and would permit NATO to reinforce and rearm forward units.

Since then the world has changed dramatically. While we still have the bad actors I mentioned, the highest probability of offensive action is with lesser adversaries. Missions have also changed. The DoD is grappling with those concepts which they currently call "operations other than war." For many of these scenarios we need options other than overwhelming conventional force.

The second change is the maturity of technology. A key nonlethal paper was written by Joseph Coates at IDA in 1972. He suggested many of the technologies we are currently proposing. Delivery has always been an important issue in nonlethal weapons. Precision, data processing and miniaturization have bought us a lot. Now, we can do things that could not be accomplished in 1972. Effectiveness of both the warheads and delivery systems has improved dramatically.

The most recent change is experience. We now have commanders who have been on the ground in Somalia, Panama, Grenada, Macedonia, and currently, Haiti. They know this is an exigent need. The week before we went to Haiti, I received a call from U.S. Atlantic Command (USACOM) asking what nonlethal systems were available. I pointed out that a few days before embarking on a mission was not the time to be deploying new weapons systems. Since then, GEN John Sheehan has visited Los Alamos asking the same questions. This time there was a somewhat longer suspense. Still, he pointed to the immediacy of the requirement.

In my view, the conflicts of the future may be very different from those of the past. We have already mentioned bad actors for whom traditional force is appropriate. However, there emerge several other sets of potential adversaries for whom massive firepower may be ineffective or even counterproductive. These are called by many names, transnationals, subnationals, nongovernment organizations, plus more descriptive titles such as ethnic conflicts, religious strife, drug traffickers just to name a few.

The point in mentioning all of these entities, is that since they do not have a government per se, traditional diplomatic means for engagement are, at best, difficult for resolving issues. Further, as

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they reside within the geographic confines of one or more sovereign nations, applying force against them without cooperation from a host nation presents a thorny issue. How can we go after the Cali Cartel, resident in Columbia, without being accused of waging war with that country? If we use hard bombs, there is no doubt we have invaded that sovereign nation. Suppose however, that we attack the bank accounts of the cartel. You can see some of the issues that must be addressed. None-the-less, I believe we are better off having a legal debate over unique means of applying force, than to respond to collateral damage caused by errant bombs, or flying debris from accurate ones.

Issues. (Slide 5)

1. Semantics.

The use of the word "nonlethal" has generated a substantial amount of heated debate. The word is far from perfect, but is, in my opinion, the best for the circumstances. Please excuse my repetition, but this point keeps being raised over and over again. Many other terms have been employed to describe the effects of attempting to limit casualties. As I previously stated, some of those include, "soft kill," "mission kill," "disabling measures," "less-than-lethal," "low collateral damage," and several others. Harvey Sapolsky has even suggested that some of the technologies may be, "worse than lethal." I believe he means that in a few cases, nonlethal technologies could induce extensive physical or mental distress and suffering. As I have already pointed out, I think such systems are patently illegal, and should not be developed.

To those who think in the overly simplistic world of absolutes, "nonlethal" is a misnomer. The Federation of American Scientists has voiced that charge in their January/February 1995 Public Interest report. Of course the author, Steve Aftergood, carefully selects part of my thesis to make his point. It is true that "nonlethal" has a politically attractive connotation. But that is only a small part of this issue.

As I have stated repeatedly, nothing in this world is perfect. My cute phrase is, "properly placed, enough marshmallows will kill you." Even the most benign substances can have fatal consequences if used improperly or to those few people with physiological aberrations that foster unique susceptibilities. One need only review

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the history of the development of pharmaceuticals to understand the range of human variabilities.

There are downsides to every name postulated to describe what we are attempting to accomplish. "Soft kill" is an oxymoron. "Disabling measures" can have the connotation of permanent human physical impairment. Here again, the prohibition against maiming weapons applies. "Low collateral damage" still allows the possibility of lethal consequences for people who are in the wrong place at the wrong time.

Again, nothing is absolute. If anyone has a better suggestion, I would be happy to entertain it. But remember, no matter what attempts have been made to establish new phraseology, "nonlethal" keeps returning as the term of choice.

2. Premature Use of Force.

Some suggest that one of the reasons nonlethal weapons are politically attractive, or unattractive, depending on your point of view, is they would make it easier for governmental leaders to initiate acts of war. Proponents want more options. Opponents feel they would encourage a President to be more adventuresome.

Currently, there are limited options between diplomatic sanctions and war. Economic embargoes are one such action. Serious questions have been raised about the effectiveness of embargoes. One study stated they were effective about one-third of the time. Some believe that is an acceptable percentage. Others do not.

I believe that some nonlethal weapons could be employed as a step above economic sanctions. General Maxwell Thurman called these "Technological Sanctions" when I discussed nonlethal weapons with him several years ago. The thought is that the infrastructure of an offending adversary can be degraded in a manner that demonstrates our capability, intent and will to apply force. You may remember that Saddam Hussein did not believe the U.S. had the will or resolve to risk combat with his troops. He was wrong. But, due to prior vacillations in foreign policy, it is easy to understand how he miscued. Technological sanctions would both send a message, and concurrently degrade the adversaries ability to wage sustained conflict.

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Another view is that the President or Congress might be more willing to use force if they believed it could be done with minimal potential for loss of life. The argument then goes that they may use force without first exhausting other diplomatic avenues. It is further argued that the decision to apply force should be clear-cut and difficult. Nonlethal weapons, it is said, induce ambiguity into a decision process that must be definitive.

I submit this is a policy issue resulting from the lack of serious thinking about the problems of future conflict. There must be more options, not less. Nonlethal weapons are a part of the solution. Pining for "the good old Cold War days" with relatively simplistic problems will not answer the tough questions we will face.

3. Cost Effectiveness and Financing.

Concern has been raised that nonlethal weapons would take resources away from lethal weapons systems during this period of constrained budgets. The ability to justify new systems when we are cutting systems with established requirements is a critical issue.

There is no clear answer on this point. We recognize that it is unlikely that any new major systems will be approved in the near-term. Therefore, any nonlethal weapons design must be based on small items, or modifications to existing systems. That might mean new warheads or munitions, but not major new platforms.

To evaluate the cost of nonlethal weapons, a complete life-cycle, cost-benefit analysis must be conducted. Included in that analysis should be the strategic implications of having, or not having, nonlethal weapons. In other words, if troops are forced to rely on existing lethal weapons, and are forced to kill people resulting in open conflict, would nonlethal weapons have prevented the escalation? What is the total cost of that escalation.

In a fiscally constrained environment, there will be tough questions. We must make trade-offs based on the best information available and the likelihood of a particular scenario occurring. A significant problem lies in the DoD budgeting process. Designed for the Cold War, the seven year budget cycle was developed to counter a massive, monolithic threat. (The execution year (the current year), the budget year (next year), and the POM* years (the following five years)) Over a period of forty years, a rather rigid requirements

process was established, and set in concrete. The out-years of the POM laid out the development of weapons systems, and as they moved forward in time, they eventually became funded. Once in the POM, industry and the military began to look at the funding as a commitment. It was "their money." When shortfalls arose, staff officers went around frantically, "looking for money," as if there were a magical source hidden deep in the bowels of the Pentagon.

What has emerged in the changing geopolitical stage is the rapid evolution of new threats. Basically, these threats change inside the budget cycle. However, based on the old funding system, the military and certain industries view the projected numbers as a "promise" for future funding. Those figures, however tenuous, represent "their money." While I have somewhat overstated the case, I am not too far off the mark. Needed is revision of the budget process in a way that allows quicker response to threats and technology.

4. U.S. Vulnerabilities.

Another consideration is the degree of vulnerability the United States has to the use of some nonlethal weapons. One side argues that we should not discuss some of the proposed nonlethal systems as the U.S. is the most vulnerable to attack. If we develop or employ systems that could attack the infrastructure of a complex adversary, then they may turn those same weapons against us. A few will go so far as to suggest we should not talk, or maybe even think, about such weapons.

This is, in my opinion, a head-in-the-sand approach. One major company went so far as to say they would not help develop nonlethal weapons for that reason. But they went further. With complete sincerity, and a high degree of arrogance, they went on to state, "If we (their company) don't develop these weapons, no one else will."

I have had the opportunity to discuss nonlethal weapons with people from a number of different countries. Contrary to the myopic view of many, these are not dumb people. Quite the opposite. There are many technically sophisticated people in the world. Some are not our friends. These potential adversaries have learned, largely via Desert Storm, it would be unwise to directly confront the United States in armed aggression. They would lose, and they know it. There can be no doubt that highly creative and nefarious minds are

at work thinking about methods by which to attack America, while minimizing the potential for adverse consequences to themselves.

It is my position that we should actively explore the possibilities. Developing a technology so that we can understand the consequences, is very different from the political decision to employ those systems. I submit, in all areas we need to pursue a defensive capability as a minimum.

5. Measures of Effectiveness.

Traditionally, combat assessment has been accomplished by observing the items physically destroyed on the battlefield. This is sometimes called the "smouldering hull" technique. This approach proved problematic during Desert Storm with the introduction of penetrating precision guided munitions.

As many of you know, Saddam Hussein had built state-of-the-art bunkers, including many to protect his aircraft. With pin-point accuracy we struck those bunkers and could see conclusively the entry point of the missiles. What was far more difficult to determine was the extent of damage inside the bunker.

Similarly, precision guided bombs struck tall buildings, penetrated five or six floors and detonated. While analysts could determine the blast had occurred, predicting the amount of damage, and to what systems, was highly speculative. As a result of the imprecise combat assessments, we were forced to restrike targets that may already have been rendered combat ineffective.

Some nonlethal weapons offer a new order of complexity to an already difficult problem. On the low end of operations, consider a tank or other weapons system that has been immobilized. If that system is not physically destroyed, how can a field commander have confidence that it cannot attack his unit? The classic response is to "kill" it again, an approach that may be both ineffective and costly.

With nonlethal systems, the feedback may be more discrete. The combat assessment may require knowledge of the amount of electricity available, or the information flow, or the status of fuel. These are targets that do not well lend themselves to evaluation from photo-reconnaissance.

Therefore, when developing nonlethal weapons systems, we must consider mechanisms for measuring combat effectiveness. Since these may or may not include the use of existing sensors and platforms, the issue must be taken seriously. A requirement for new satellites would probably be viewed as prohibitively expensive. Supplying new sensors for fielded platforms may be acceptable. These are considerations that must be evaluated as part of the life-cycle costs. I believe it is essential that commanders at all level be provided with accurate combat assessment. Otherwise, we cannot expect them to employ these systems with any degree of confidence.

Actions. (Slide 6)

In my estimation there are three major action items that must be attended to in short order. They are establish policy, write requirements, and develop weapons systems.

1. Policy.

A draft policy document at OSD level was prepared as early as June 1994. Apparently, not much action concerning that document has occurred since that time. Clearly, some discussion has transpired, due primarily to recent operations in Haiti and Somalia.

The OSD document is not the only paper in draft form. Others also languish with bureaucrats. Most of the documents I have seen have been generated by contractors with little, if any, prior expertise in nonlethal concepts. Some are shallow papers modelled after existing policy documents on unrelated topics.

While an interim nonlethal policy document would be useful, there is a need to hold serious sessions and discuss the issues with people who have thought about the problems. There should also be a technical education process so the authors can sort fact from fantasy.

2. Requirements.

This is probably the most urgent need. We have a development process that is ostensibly requirements drive. The reality is that development is a reciprocal process balanced between "requirements pull" and "technology push." Therefore, we need to both educate potential users about the availability of future technology, and postulate the missions to which they will be applied.

To accomplish this task, we must enlist the aid of very bright, innovative people who are grounded both in the military culture, and technology. I am asking for visionaries, a commodity that is hard to come by. As far as I know, we have yet to have a skill designator of "visionary" assigned in any of our services. However, the thinkers involved in the nonlethal weapons requirements process must be able to project themselves into scenarios of future conflict that are very different from operations of the past. The Army operational planning adage of, "Three up, two back, and hot socks on the objective," just won't get it.

While we need to look to the future, there are lessons to be learned from recent and current operations. Requirements writers should employ people who have been on the ground and have "real-world experience" on which to draw. But don't stop at what was. Use the real situations and extend them by making them more complex that they were, or adding new technical possibilities.

To support requirements writing, I encourage the use of models and simulations. A family of models and simulations could be a cost-effective method for trying out new techniques and technologies. Traditional models may have a tough time adapting weapons that function on an area basis. Since operations other than war have a high probability of occurrence, we can use models and simulations to both test new concepts, and as a training device.

An adjunct to the requirements process may be to establish a lexicon. One of the current problems is defining what we are talking about in terms of common understanding. This would not be an insignificant task as once developed, it must be disseminated and gain acceptance.

3. Develop weapons systems.

To be believable, it is essential that we get nonlethal weapons systems into the hands of troops. Of course, things like pepper spray and CS grenades have already been fielded. We need to do more than that. The troops must receive some of the weapons we have been talking about. In the Somalia extraction operation, it looks like U.S. forces will be provided with some options such as sticky nets. While this is a start, a routine process for issuing nonlethal weapons

should be established. Lets get them into the hands of troops well prior to deployment. Training prior to employment is essential.

There now exists extensive lists of potential technologies. Lacking on the Government side, is a designated center to manage development of nonlethal systems. There is a need to decide who will lead, and get that designated organization firmly established and recognized by all of the services as well as other agencies with interest in nonlethal weapons development.

From a pure technology perspective, we should focus on demonstrations. There is, in my view, too much "view-graph engineering" of nonlethal systems. While there are a few technologies that may worth the cost of long term R&D, emphasis should be on technologies that can be placed in the hands of troops and tested. This will build the credibility the field needs. From my knowledge of the current state-of-the-art, I believe several technologies exist that could be tested in less than a year, at costs under \$100K. Of course larger systems could cost more, but lets build up from the existing base.

Summary

Nonlethal weapons should be considered as part of the solution to the future of war. They are not a panacea. They are not perfect. No system will be. But, they do offer options. Options that are urgently needed by commanders today. Commanders who are at this moment in Somalia, in Haiti, in Macedonia, and lest we forget, in the Sinai. Additionally, law enforcement agencies are faced daily, with life and death decisions in applying force. All of these organizations are in need of new force options.

This is not just a U.S. issue. Many nations are exploring nonlethal weapons from both an offensive and defensive perspective. We should do likewise. In fact, I believe this is an area in which we have, and should maintain a lead. The potential is great.

At this time we need to move forward and establish a coherent policy on development and use of nonlethal weapons. We need active involvement of the CINCs, their staffs, and others with operational experience in the development of hard requirements. There is an opportunity for involvement from industries and

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laboratories alike to put forth the technologies that will provide the nonlethal weapons systems.

We have the ability to use overwhelming force against traditional adversaries. But, in my opinion, if the United States is going to retain the ability to effectively apply force in a future dominated by unconventional threats, we must develop an arsenal of nonlethal weapons as part of the solution.

Thank you.

*** POM - Program Objective Memorandum The budget document that allows planners to begin allocating resources to requirements as far as seven years from the current time.**

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NON-LETHAL DEFENSE

DEFINITIONS:

NON-LETHAL WEAPONS: WEAPONS THAT DISRUPT, DESTROY OR OTHERWISE DEGRADE FUNCTIONING OF THREAT MATERIEL OR PERSONNEL WITHOUT CROSSING THE "DEATH BARRIER".

NON-LETHAL DEFENSE: AN INITIATIVE THAT:

- DEVELOPS NEW WEAPONS SYSTEMS, STRATEGY, AND DOCTRINE THAT ALLOW PROJECTION OF POWER WITHOUT INTENTIONALLY CAUSING FATALITIES
- PROVIDES THE ALL COMMAND LEVELS NEW OPTIONS IN MAINTAINING REGIONAL STABILITY & DETERING CONFLICT
- EXPANDS THE TECHNOLOGY BASE ON A MULTIDISCIPLINARY BASIS
- RESPONDS TO THE EMERGING THREATS

MISSION

TO EXPAND FORCE OPTIONS AVAILABLE TO COMMANDERS AND ALLOW THEM TO EFFECT CONTROL OVER PEOPLE AND SITUATIONS IN WHICH THE APPLICATION OF LETHAL FORCE IS UNDESIRABLE

TECHNICAL AREAS

ELECTROMAGNETIC/
ACOUSTICS

MATERIALS

MICROBICS

INFORMATION

KINETICS

SCOPE OF APPLICATION

RE-CONFLICT —▶ EMBARGO —▶ LOW INTENSITY CONFLICT —▶ MID INTENSITY —▶ STRATEGIC
PRIMARY SYSTEMS ADJUNCT SYSTEMS ENHANCE LETHAL SYSTEMS

NON-LETHAL DEFENSE: A WORKING DEFINITION

**APPLICATION OF TECHNOLOGIES THAT ALLOW FORCE TO BE PROJECTED
WHILE MINIMIZING THE POTENTIAL FOR LETHAL CONSEQUENCES**

GOALS INCLUDE:

- NO UNINTENTIONAL LOSS OF HUMAN LIFE**
- CONTROLLED LEVELS OF PHYSICAL DAMAGE**
- EXPANDED OPTIONS FOR COMMANDERS**

WHAT'S NEW?

- WORLD GEOPOLITICAL SITUATION**
- MATURITY OF TECHNOLOGY**
- EXPERIENCE**

SOME NONLETHAL WEAPONS ISSUES:

- SEMANTICS**
- PREMATURE USE OF FORCE**
- COST EFFECTIVENESS & FINANCING**
- U.S. VULNERABILITIES**
- MEASURES OF EFFECTIVENESS**

*** Note: This is not designed as an exhaustive list**

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PROPOSED ACTIONS:

- ESTABLISH POLICY

- WRITE REQUIREMENTS

- DEVELOP NONLETHAL WEAPONS SYSTEMS