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UNDERKILL

SCALABLE CAPABILITIES FOR MILITARY OPERATIONS AMID POPULATIONS

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Summary

During COIN operations, the population is not just the field of battle but the prize of battle. Success depends on earning the cooperation of the people, whose security thus becomes one of the chief responsibilities of COIN forces. Early 21st-centrury battles have demonstrated the disadvantages faced by a force that lacks adequate options to act forcefully against insurgents without risking death or serious harm to noncombatants. In Iraq, Afghanistan, Lebanon, and, most recently, Gaza, enemy fighters have hidden in dense populations, challenging—practically daring—U.S., coalition, or Israeli forces to attack. In all three cases, superb armies with precision weapons have had to rely more or less entirely, for lack of better alternatives, on the use of deadly force against extremists who, dressed like everyone else, hide in tenements, mosques, and hospitals. The advent of global media has only compounded the problem: Enemy propagandists have a field day when COIN forces kill or injure innocent people.

The United States cannot afford to take the attitude that civilian casualties are unfortunate but unavoidable. Expressions of regret cannot repair the political damage caused by harming people whom U.S. troops are supposed to protect. When the U.S. military is entrusted with responsibility for security in another country, that country's inhabitants should be accorded the same protection from death and injury that Americans enjoy at home. A lower standard is indefensible on strategic, political, and logical grounds. In fostering effective and legitimate government in war-torn countries, the United States expects indigenous security forces to be as careful with the lives of their citizens

as U.S. security services are with the lives of Americans. Because U.S. forces operating abroad must meet the same standard they prescribe for indigenous forces, the U.S. military can be no more tolerant of civilian casualties abroad than at home. Thus, for missions other than combat against identifiable enemy forces, U.S. forces should treat as paramount the safety of the people among whom they operate.

Such lofty principles will evoke some controversy. Do enemy fighters abroad have rights comparable to criminals at home? Must hostile intent be clear before U.S. troops use force? How can such a standard be reconciled with the fact that COIN may involve hostilities with persons that do not have, and arguably do not deserve, the protections accorded even the most-violent domestic criminals? Yet, these questions do not alter the fact that harming innocent persons abroad can seriously damage U.S. interests, especially when U.S. forces are responsible for the security of those very persons. This is the essence of the dilemma facing U.S. forces when they are pitted against combatants hidden among noncombatants.

Resolving this dilemma demands options that enable U.S. forces to prevail over enemy fighters without harming innocent people of similar appearance in the same location. Such options would make critical the proof of hostile intent and could neutralize dangerous individuals without harming innocent ones under U.S. protection. *Only with the right capabilities* is it possible to meet the proposed high standard of concern for innocent lives abroad without jeopardizing the missions or safety of U.S. troops in the presence of enemies with deadly intent.

The challenge of carrying out dangerous missions amid populations is not confined to COIN. Peacekeepers are often interposed between warring factions. Humanitarian-relief efforts can place U.S. soldiers in contact with desperate and unruly crowds. Intervention to halt genocide can be confounded by the mingling of predators and their prey. Quelling public disorder and rounding up looters, abroad or at home, may confront U.S. troops with the need to curb violence without using violence. The need to free hostages, isolate terrorists, and board suspicious or pirated ships with captured crews is increasing.

One is struck by the diversity of such U.S. military missions other than traditional warfare. Lumping such missions together as "irregular

operations" or "stabilization operations" risks inadequate preparation for missions that can differ as much from one another as they do from regular combat. Some border on police work—e.g., enforcing order and managing crowds—which can fall to military troops when police are unavailable or inadequate, as is often the case. In other situations, U.S. forces may face enemy fighters who favor urban areas because such environments allow them to conceal themselves or endanger the people among whom they hide—or simply cause more carnage. Missions against enemy combatants usually entail different objectives, rules of engagement, and tactics than those involving the control of noncombatants. Still, the common aspect of these diverse missions—operating amid populations—points toward a general need for better options.

The growing frequency and significance of operations amid populations suggests a regular—rather than rare—need for U.S. military forces to be able to gain control of situations, perform their tasks, and protect themselves without using deadly force. Although nonlethal options have long been essential in law-enforcement missions, in which ensuring public safety with minimum violence is stock-in-trade, they have been regarded by the military as having only limited utility in only exceptional circumstances. This disregard for nonlethal weapons is evidenced by the mere $50 million spent annually on nonlethal weapons by the Joint Non-Lethal Weapons Directorate (JNLWD) of the U.S. Department of Defense. Although foreign insurgents present dangers exceeding those that police face in American cities, U.S. military forces could remedy a major shortcoming they face in COIN and other important missions if they had nonlethal capabilities that could produce a range of effects and the skills to use them. Such options would offer typical small units more flexibility, self-sufficiency, and speed; less risk of making mistakes with wide political repercussions; and better odds of accomplishing their missions.

Given the nature of the missions and responsibilities of U.S. forces, being able to disable persons without killing them is too low a standard. Even short of lethal force, violence against populations whose trust and cooperation U.S. forces need to earn—and which themselves are the key to ultimate success—may ruin the mission and set back an

entire campaign. Pain, shock, or injury may turn a crowd into a mob, a mob into a confrontation, or a confrontation into a cause célèbre that can fuel insurgency. Therefore, the ability to calibrate nonlethal force from none to mild to moderate to intense can be as important as simply not causing death. The need is for a continuum of force.

In essence, this continuum must enable U.S. forces to affect the behavior of but not harm noncombatants while at the same time gaining advantage over enemy combatants who may look like and hide among those noncombatants. For example, being able to cause innocent persons and any enemy fighters who are intent on completing a hostile mission to respond in noticeably different ways would permit more-focused and more-forceful action, lethal if necessary, against the latter while minimizing harm to the former. Likewise, having the means to disorient but not injure individuals could take the initiative away from attackers without jeopardizing the well-being, good will, and future cooperation of the larger population.

To the extent possible, the continuum of force should be based on a more or less standard set of capabilities available to regular small military units involved in COIN, peacekeeping, humanitarian intervention, and other irregular operations amid populations. This need stems from the fact that the U.S. military as a rule does not rely on specialized forces for such missions but instead uses the same force types for each. The exception, special operations forces, cannot be used for every operation other than force-on-force combat. Moreover, regular units operating amid populations may not know each morning the sorts of predicaments and persons they will face that day. The need for capabilities that range from nonviolent to lethal force is common, varied, and unpredictable; the need for small units to act swiftly argues against having to call in capabilities from higher echelons.

These factors place a premium on versatile and portable capabilities that can be carried and used by small units that operate amid populations and face uncertainty. Additionally, these capabilities should be scalable—capable of producing a range of effects, from nonharmful[2] to extreme or even lethal—to enhance the ease and speed of escalation and de-

[2] By *nonharmful*, the authors mean harmless in intent rather than harmless in effect.

escalation as a situation unfolds as well as obviate the need for awkward or time-consuming transitions from one set of equipment to another. Furthermore, scalability implies a reduced number of different systems that may be needed, thus resulting in better portability and supportability. Continuum-of-force capabilities should also be affordable enough that most small units can be equipped with them. Finally, because missions and conditions that require a continuum of force are a present reality rather than a future possibility, technologies that are at hand or only a few years away from maturity are preferred, all else being equal, over those of speculative science.

An effective continuum of force will require that U.S. troops have

- decision-making talents that exploit information, gain time, and seize the initiative from adversaries
- performance standards and skills that allow them to escalate their use of force during a confrontation in order to gain advantage while managing risk
- readily calibrated effects that range from nonviolence to lethality.

These prerequisites can be met thanks to advances in information networking and cognition, germane experience with nonlethal force resident in the law-enforcement community, and progress in a wide assortment of potentially relevant technologies. Thus, a continuum of force is not only needed but feasible.

Having defined a general need and offered reasons to think that need can be met, we believe that specific continuum-of-force capabilities should be based on operating requirements. These requirements have been identified through examination of a diverse and representative set of realistic tactical scenarios encompassing COIN, peacekeeping, humanitarian relief, civil order, and other missions and conditions that small units might face. From 24 such scenarios, some common themes emerge:

- the prevalence of small-unit engagements and the corresponding need for junior officers and noncommissioned officers (NCOs)

to be able to decide in dangerous and urgent circumstances what measures to take
- partial, ambiguous, confusing, or deceptive information about the identity, motivations, and intentions of persons engaged
- uncertainty about the actual physical, physiological, and psychological effects of nonlethal weapon systems on individuals and groups
- the importance of seizing initiative from and exerting control over dangerous persons amid innocent ones
- the utility and difficulty of communicating with groups, especially large groups, of persons engaged by U.S. forces
- the likelihood of dire political ramifications if civilians are killed or hurt, claims of which are amplified by global media and distorted by enemy propagandists
- the need for mild, even nonviolent, initial effects in order to gain time, information, initiative, and control, including the differentiation or separation of combatants from noncombatants
- the importance of rapidly scalable and portable capabilities.

These findings suggest that the problem of acting forcefully against adversaries amid populations is as much one of gaining and using knowledge as causing desired effects. Therefore, an integrated solution—part information, part judgment, and part physical capability—is needed, and has been missing so far in the search for nonlethal options.

In regard to physical capability, we assessed numerous options using operating requirements derived from the study's scenarios, along with four key general criteria: versatility, portability, scalability, and feasibility. Some options appear to be efficacious under some but not all conditions. For example, a small unit patrolling neighborhoods without knowing whether, when, and what threats could appear cannot routinely include in its patrols a heavy truck with a microwave transmitter. Anti-electronics capabilities are of value only when enemy fighters are in vehicles or otherwise relying on electronics. Flash-bang munitions have limited range and may be frightening to innocent persons who happen to be present. Electric-shock tasers are useful only at

short range against small numbers of individuals, are not scalable, and can cause pain. Tear-gas may alienate otherwise sympathetic persons. Rubber bullets produce pain, if not injury, and are not scalable. Recognizing that these options may be useful only in specific circumstances, we aim to identify options with such wide utility across possible missions and conditions that ordinary small units should and could routinely be equipped with and trained to use them.

Although no single technology satisfies this general need, the options of greatest promise involve sound and light. Both can be effective in hailing, inhibiting, disorienting, disrupting, or degrading the key sensory faculties of dangerous persons up to hundreds of yards away without necessarily causing lasting harm to them or to innocent persons. Their effects can range from mild to severe, affording users the opportunity to observe the effects of their weapons and make adjustments. As an effect's intensity increases, enemy combatants and noncombatants may react differently, isolating the former and scattering the latter, thus reducing the number of potential targets against which to direct even harsher measures. Sound and light can be used against large groups, small groups, or individuals. Considering a wide range of lasers—from low-energy to high-energy to femto-second pulses—means that the desired effects can be even more pronounced.

Directed sound and light, including light from lasers, appeared useful in many of the study's scenarios and thus are versatile. They are sufficiently portable (on foot or in small vehicles) that platoons or squads can carry them on most missions. They do not involve physical projectiles, violent contact, or inhalation, any of which could prove counterproductive if used against people whose cooperation is needed for the mission to succeed.

As part of an integrated approach, directed-energy capabilities can be complemented by an innovative communications technique involving the use of cell phones. If friendly authorities have privileged access to cell-phone switches, a unit commander could request that all cell phones in a given neighborhood or congregated group of people be called to transmit simple text or audio messages that alert, warn, reassure, or instruct. Even if only a fraction of those present receive the message, the rest would be promptly told its contents. The utility of

adding this feature to a directed-energy suite of capabilities was apparent in many of the study's scenarios.

In addition to a cell-phone warning system, the continuum of force could exploit video technology. Vehicle-, weapon-, or fixed-mounted cameras and video recordings could aid in learning lessons, adapting systems and tactics, refuting unfounded rumors and propaganda, and collecting intelligence about, for instance, dangerous persons. In addition, live video could help forces manage escalation or de-escalation.

An assessment of technologies cannot be based on technical grounds alone. Military operations amid populations are fraught with political risks, which enemies and unfriendly media organizations are poised to exploit. The potential for adverse reactions among people affected or the wider population is a function of both the severity and the strangeness of the effects of a given capability. The unfamiliar may give rise to panic, rumor, superstition, and disinformation. However painful their effects, rubber bullets at least will not be blamed for subsequent tumors, impotence, infertility, or mental disorder. Even intense sound and light are less likely to cause adverse psychological and political reactions than are chemicals, shocks, or "rays." At the same time, the use of lasers might be misunderstood by those illuminated or misconstrued by propagandists.

In the same vein, cell-phone messaging to alert and inform citizens about the use of nonlethal force may raise psychological and political questions. Although citizens may appreciate being warned, instructed, or reassured, they may at the same time react adversely to the perception that U.S. forces or their own government is able to send them messages at will and, by implication, access their phones (and conversations). One way to win public acceptance for the cell-phone messaging concept is to give each person a choice of whether to subscribe to public warnings upon acquiring a cell phone or service contract. Although some would decline the option, those who did subscribe would most likely not be suspicious upon receiving an alert message—in fact, they would be reassured. In time, more people would likely sign up for this service. Likewise, people suspicious of increasing levels of video-camera surveillance would have to be educated about and convinced of the security benefits.

In any case, it is imperative to communicate early, persistently, and accurately the rationale behind and facts of all aspects of a continuum of force to people who may be affected. The unifying theme of such communication must be that U.S. forces accept their duty to safeguard the people of countries where they operate and, accordingly, are depriving killers of the benefit of hiding among and harming those people. Without such communication, even careful use of nonlethal force can go awry.

The suite of capabilities described in this book is for the most part technologically feasible. Aspects that require development include the following:

- very-high-intensity[3] sound that is precise, scalable, effective at long ranges (i.e., hundreds of yards), and can cause discomfort, disorientation, or incapacitation
- femto-second lasers
- software that permits selective and instantaneous cell-phone messaging to users in a particular area
- deployable links for real-time video
- improved portability of all elements of the suite, with a view toward fielding some or all capabilities with dismounted troops, thus improving versatility.

In addition, capabilities should be engineered as an integrated system suite with, for example, common power sources, displays, controls, and physical packaging.

Of course, the requirement for an integrated suite adds to complexity and raises concerns about the feasibility of the whole. A more serious potential problem than the feasibility of individual pieces themselves is whether the integration of the components, including important information and communications features, is feasible in the near-to-medium term, especially when taking into account the need for sophisticated operators and nuanced doctrine. Without underestimating the associated challenges, we regard such integration as well

[3] That is, powerful and focused.

within the capability of the U.S. military and its system providers. Moreover, the suite proposed here does not depend on, and should not await, every component.

In its fullest form, then, the suite of continuum-of-force capabilities envisioned here could consist of directed sound, directed light, lasers, cell-phone communication, and video observation. As a whole, this suite is remarkable in its nonkinetic character: For the most part, it affects the senses and perceptions rather than the physical condition of persons engaged. This does not mean that kinetic nonlethal or lethal capabilities have no place in the range of options available to U.S. forces operating amid populations. Yet, the idea of alternatives to physical violence leads to a host of emerging but largely proven technologies which, used creatively and together, offer U.S. forces ways to control situations and gain advantages over enemies without harming persons who ought not to be harmed.

As important as developing and integrating technology is ensuring that this nonlethal capability can be incorporated into and used effectively by ordinary small U.S. military units. A continuum of force must include abilities to sense and grasp a fluid situation, judge how to respond when the nature and intentions of the persons engaged are unclear, understand and anticipate behavior, communicate, escalate and de-escalate wisely, and be sensitive to the wider repercussions of actions. To use well the technologies suggested here, it is necessary to instill methods of adaptive decision-making under pressure.

To incorporate continuum-of-force capabilities into an ordinary small unit, it would be better to rely on a well-trained, experienced, specialized *team-within-unit* than to prepare, involve, and have to control every member of the unit. The former approach would allow the unit commander to concentrate on the essential tasks of sensing, reasoning, and adapting during the operation. Placing high-powered sound, light, and lasers in one vehicle fits with the team-within-unit approach. Finally, a team-within-unit would allow most members of the unit to be concerned only with the use of deadly force, thus lowering the risk that nonlethal options might impede the use of lethal ones.

Assuming such an approach is adopted, the military will need to invest in the requisite human resources and abilities, especially

- training and educating junior officers and NCOs in continuous sense-making and decision-making when faced with uncertainty, urgency, and risk—physical and political—amid populations
- selecting NCOs with the temperament and aptitude for technical and behavioral aspects of the continuum.

A related matter is the nature and content of instructions to be issued to these teams-within-units and their commanders. A notable advantage of relying on a few well-trained and seasoned NCOs is that they will not require detailed or rigid instructions. Given the uncertainty and fluidity of situations requiring a continuum of force, clear but flexible guidelines akin to those on which police departments rely are preferable to elaborate field manuals and checklists.

Creating a continuum of force will require a multifaceted effort that is best conducted by one of the U.S. military services acting as executive agent. There is no compelling reason why the Marine Corps should relinquish its current role as executive agent unless, upon considering future missions, it concludes that the continuum is not crucial for its small units. In that event, tempting as it is to look to Special Operations Command to introduce innovative capabilities, it must be remembered that the situations in which a continuum of force may be needed are so common that regular ground-force units must be prepared to use the continuum. This argues for making the Army the executive agent if the Marine Corps declines the role. Alternatively, given that several services could make use of continuum-of-force capabilities, a case can be made for placing the responsibility with Joint Forces Command.

In any case, the scope of JNLWD's work should be expanded beyond nonlethal technology to include sensing, cognition, and communications. Considering this requirement and the need for research and development of the suite of capabilities suggested here, we recommend an additional $250 million in funding for JNLWD for 2009–2013, roughly doubling its current budget. More funding than that will be needed, of course, as new capabilities are acquired.

As the U.S. military fashions a continuum of force, we urge it to pursue international collaboration, not only with close U.S. allies

(e.g., NATO) but also with the United Nations' peacekeeping department and a wide circle of like-minded countries with similar needs. There are few if any risks associated with such collaboration, and it is in the U.S. interest to foster widely the fielding of capabilities that can be effective against enemy fighters without harming civilians.

In sum, a continuum of force for regular U.S. troops operating amid populations is needed and possible. Scalable and portable technologies—e.g., directed sound and light—are in train or within reach. But those technologies do not provide a complete solution: The ability to prevail against dangerous enemies without harming innocent people and jeopardizing larger campaign goals depends crucially on the skill, sensitivity, and preparation of U.S. soldiers. In turn, creating and mainstreaming this ability will require vision, initiative, commitment, and persistence on the part of those soldiers' civilian and military leaders.