1. Title: Protocol FWR-2005-0037-H, Military Utility Assessment of the Active Denial System (ADS) in an Urban Environment
2. **Principal Investigator:** Miller, Stephanie A., AFRL/HEDR, (210) 536-3881 (DSN 240-3881), Stephanie.Miller@brooks.af.mil
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5. **Contractor Support:**

   Aegis Technologies, Albuquerque, NM.

   Conceptual Mindworks, San Antonio, TX.

   General Dynamics, San Antonio, TX.
6. **Facilities:** McKenna Military Operations in Urban Terrain (MOUT) Facility, Ft Benning, GA
7. **Protocol Objective:** The objective of this experiment is to assess the military utility of the Active Denial System 1 (ADS), a millimeter wave (MMW) directed energy weapon, when operated in the field against multiple human volunteer subjects, in various urban scenarios where non-lethal weapons might be used.
8. **Background and Relevance:**

   A. The research and evaluation proposed in this protocol includes partnership between multiple Air Force entities for the purposes of rapid fielding and acquisition of a highly-desired new military capability. The proposed investigations will result in data required for transition of the ADS from the laboratory setting into the hands of the operator and to a System Program Office. This project fulfills requirements of the Air Force Research Laboratory (AFRL) system developers and bioeffects experts, while also fulfilling the requirements of the Air Force Operational Test and Evaluation Center (AFOTEC). Participation in this process by the Institutional Review Board is necessary since behavioral data will be collected and the subjects will be surveyed.

B. Data Required. Before the ADS can be deployed for operational use, the military utility of this non-lethal, antipersonnel, directed energy weapon must be assessed under realistic field conditions. In particular, technologists, operators, and policy-makers must be confident that the weapon will be effective against groups of people engaged in various urban scenarios developed by AFOTEC, without substantial risk of undesirable target effects. Furthermore, it is important that we understand the motivation and cognitive processes underlying the behavioral responses to exposure. Execution of the research outlined in this protocol will deliver that essential data.

C. Current R&D Status and Warfighter Demand: The development of the ADS by the Air Force has been hastened by successful advances in the technology and because of an intensified demand by the warfighter for the system. In 2002, the ADS won a high-interest designation as an Advanced Concept Technology Demonstration (ACTD) from the Deputy Undersecretary of Defense for Advanced Systems and Concepts. This designation was facilitated by the involvement of the Joint Non-Lethal Weapons Directorate and sponsorship from Joint Forces Command. The outcome of the ACTD must include a residual operating ADS weapon for use by warfighters in field exercises and perhaps actual missions. Effective performance of a number of mission tasks in the Joint Mission Area Task Analysis could be aided by including ADS as a deployed weapon for mission accomplishment.

The increased demand for this system is the result of successfully demonstrating the repel effect in human subjects exposed to ADS in field research conducted by AFRL. Human and animal bioeffects research conducted by AFRL found no adverse health effects associated with ADS exposures. This research supports the effectiveness and safety of the ADS exposures. Research by AFRL/HED and Naval Health Research Center-Detachment (NHRC-Det) scientists at Brooks City-Base supports the safety of the system for face and eye exposures, and also indicates the absence of risk for acute or long-term undesirable health effects. While there has not been a formal epidemiological study conducted on the effects of ADS exposure, over 12 years of research has been executed. The research has been reviewed by the Human Effects Advisory Panel (an independent panel of Blue Ribbon experts), the DoD's Human Effects Review Board, the Armed Forces Epidemiological Board, OSD's Tri-Service Electromagnetic Radiation Panel, and the Senior Military Medical Advisory Council. In all cases, the reviewers agreed with the interpretation of the results. 95GHz energy is non-ionizing and does not break DNA bonds, therefore it cannot initiate cancer. The effectiveness of ADS was assessed during a Limited Military Utility Assessment using a fixed-site system. Structured questionnaires and interviews with the subjects were administered by AFRL/HED as a means of further assessing effectiveness. The most critical operationally relevant element of this research was the assessment of weapon effectiveness and of successful mission accomplishment by security forces during the operational scenarios.

D. Rationale. Over a decade of research from AFRL supports the safety and likely effectiveness of ADS as a non-lethal weapon. In 1947, Moritz and Henriques published studies on conventional heating of human skin the results of which, when extrapolated to the MMW heating of ADS, provide assurance of a significant and useful safety margin between effective levels and injury. Rodent, swine, and human studies on the thermal bioeffects of MMW exposure support this assertion. Chalfin et al. (2002) measured ADS energy related to facial sensitivity, eye aversion, and corneal damage in nonhuman primates (rhesus macaques) and their findings support the safety of using the ADS for the proposed human exposures.

The research proposed in the Experimental Plan (see below) is critical to both the operational effectiveness and the policy acceptability of the system. Systematic behavioral assessment of the weapon's effectiveness is on the critical path to deployment. To date, this assessment has been limited to a fixed site application using 4 small-group scenarios. An additional Military Utility Assessment (MUA) aimed at assessing the effectiveness of ADS for force protection scenarios against large and small crowds is scheduled for the summer of 2005.

Relevance. The technology to be tested in these experiments was developed in response to several Mission Needs Statements (MNS, AFSOC 003-95, Nonlethal/Limited Effects Weapon Capability, dated 22 July 1996; MNS LOG 1.85, dated 20 February 1996, which stated requirements for improved capabilities in Military Operations Other Than War [MOOTW]; Marine Corps Development Center MNS #MCCDC-9602029, NAVMC HQ-355). The Joint Non-Lethal Weapons Directorate has responded to these needs statements by drafting an Operational Requirement Document (ORD) for Non-Lethal Active Denial Technology (ADT) Capability dated 25 October 1999. An ACTD (see above) was approved in February 2002. Results of the proposed studies will answer critical questions for operational effectiveness.

9. **Impact Statement:** Success with the technology to date has put it on a fast track to satisfy a warfighter request via the ACTD process and rapid acquisition of a transformational bioeffects-based directed energy technology. The experiments included in the AFRL/HED Bioeffects Research Proposal to Support the Active Denial System (Scholl & Mason, 2005) help answer these requirements: Mission Needs Statements (MNS, AFSOC 003-95, Nonlethal/Limited Effects Weapon Capability, dated 22 July 96; MNS LOG 1.85, dated 20 FEB 96, which stated requirements for improved capabilities in MOOTW; Marine Corps Development Center MNS #MCCDC-9602029, NAVMC HQ-355); The Joint Non-Lethal Weapons Directorate drafted an ORD for Non-Lethal ADT Capability dated 25 October 1999.

10. **Experimental Plan:**

A. Equipment and Facilities. Exposures will use a MMW transmitter (ADS System 1) at the McKenna MOUT Facility, Ft. Benning, GA. High-power microwave specialists at AFRL/DEHA, their contractors, or potential field operators will direct

operation of the ADS System 1. Experienced scientists from AFRL/HEDR and their contractors will collect the bioeffects data and control research trials for the health and safety of the volunteers. Test and evaluation professionals and contractors from Det 1 AFOTEC will gather data for military utility assessment.

Subjects: 270 adult volunteer subjects will be recruited from among military personnel. Volunteers of either gender must be at least 18 years old. Attempts will be made to obtain subjects who have never been exposed to the ADS energy beam. Naïve subject participation will strengthen the ability to predict the reaction of actual targets in an operational setting. The experiment will be conducted over the course of seven days (10 hr/day). Subjects will be recruited by the Principal Investigator who will verbally address units that have expressed an interest in participating in one of the ADS ACTD Military Utility Assessments. The technology and bioeffects will be described as well as the experimental procedures, risks, exclusionary criteria, and the fact that those who volunteer are free to discontinue their participation at any time. Commanders will not be present during the briefing and will be pre-briefed about the importance of volunteer subjects.

B. Duration of the Study. It is anticipated that data collection can be completed within 1 year after final approval of this protocol.

C. Procedures.

1) Experimental Procedures:

General. Medical surveys will be given to each subject to document any pre-existing (but not necessarily disqualifying) conditions and medications. Medical surveys will be repeated at the conclusion of all exposures. Subjects with positive responses will require further evaluation by the Medical Monitor or her designee. An examination and photos may be required. As the effects of refractive surgery (e.g., PRK, LASIK) have not yet been determined people who have had refractive surgery will not be allowed to participate. Women who are pregnant will not be allowed to participate. There is some concern that they could stumble and fall as they are rapidly moving away from the beam. In addition, certain chronic medical conditions may be disqualifying at the discretion of the Medical Monitor.

I. Experimental Procedure. The purpose of this study is to assess the utility of ADS by employing it in scenarios developed by AFOTEC (see Attachment D). In each scenario, the volunteer subjects will play the part of threat, non-combatant, or security forces persons. Only the threat persons will be targeted by the ADS, but it is possible that the non-combatant and security forces persons may be exposed collaterally. A pre-exposure medical questionnaire (Attachment F) will be administered to each volunteer subject prior to commencement of the exercise.

Three ADS crews of two individuals each and an NCOIC will be trained prior to the commencement of the exercise so that they can be familiarized with the operation of the ADS and rules of engagement for using the ADS in

preparation for assessment scenario execution. The ACTD Management Team will coordinate and plan the assessment with the Soldier Battlelab. Adaptive planning and execution will be controlled by AFRL/HEDR and AFOTEC, Det. 1 to ensure training, assessment, and safety objectives are met. AFOTEC has a certified range safety officer that assists in conducting the exercise. The exercise must be in compliance with ground safety at all times and the PI and MM ensure that the experiment is conducted within the scope of the protocol.

For each scenario iteration (see Attachment D), the participants will be divided into three groups. One group will play the role of the aggressor or Red Force, one group will play the role of Security Forces, and a third group will participate as non-combatants. All scenarios will be run up to five times (three times during day light and twice after dark). The Traffic Control Point Cordon & Search scenario will consist of 10 Red Force, 25 Security Force, and 15 non-combatant members. The Defense of Terrain scenario will employ 20 Red Force members, 25 Security Force members, and 20 non-combatants. The Breach of Obstacle scenario will use 10 Red Force members, 35 Security Forces, and 10 non-combatants. In the Route/Area Clearance scenario, 25 Security Forces will defend against 10 Red Force members. As many as 10 non-combatants will participate in this scenario. The final scenario represents a Search and Rescue (SAR) Mission with 25 Security Forces, 10 Red Forces, and 20 non-combatants. In all cases, the numbers listed above represent the maximum number of participants. Group assignments will be made prior to the beginning of the exercise.

Tabe 1 Subject Allotments

Scenario	Security Force	Red Force	Non-Combatants
Traffic Control Point	25	10	15
Defense of Terrain	25	20	20
Breach of Obstacle	35	10	10
Route/Area Clearance	25	10	10
Search and Rescue	25	10	20

The principal investigator or her designee and the Medical Monitor or her designee will be in the command center so that they can easily stop the use of ADS if necessary. The AFRL/HED medical team will be present on site to assess subject safety and be available for treatment throughout the exercise. Medical observers on site will be in communication with the principal investigator and exercise director so that they can remove subjects from the exercise and/or terminate the use of ADS if deemed necessary.

The fluence for each exposure will not exceed 12 Joules/cm^2. This exposure cap will be ensured by well-defined operating parameters executed through the rules of engagement, operating checklists, trained operators, and quality control, as well as the software controls built into the system. To verify the peak power of the beam, a carbon-impregnated Teflon or KAPTON plate, the surface of which heats at rates similar to the skin, will be exposed and the heating distribution will be measured by infrared (IR) thermography prior to the start of each test day.

Video images will be recorded with cameras on the beam boresight as well with cameras located in the vicinity of the scenario. In some instances, subjects will be imaged using IR thermography. The video images will be time marked with the onset of beam activation. Individuals will be instructed to hold their hand up and exit the playing area should they want to be removed from play. If someone removes themselves from the exercise, they must remain out of play for 15 sec before reengaging. This action will allow the exposed skin to cool down before the subject is re-exposed. The ADS operators will be instructed in the ROEs and operating instructions to not reengage these participants during this period.

After participation in the scenario, subjects will be asked to answer a military utility assessment questionnaire (Attachment E) provided by AFOTEC. Brief surveys assessing the subjects' perception of their behavior will also be administered (see Attachment C). Post-MUA medical screening will also be accomplished using a questionnaire (Attachment F). Subjects with positive responses to the medical survey will require further evaluation by the Medical Monitor or designee. An examination and photos may be required.

2) Data Analysis: As these experiments are exploratory in nature, inferential (hypothesis testing) statistics will not generally be employed.

3) Safety Precautions: Field mapping will be conducted prior to the exercise to identify any hazard zones and these zones will be cordoned off prior to the start of the experiment.

Based on the ADS bioeffects data collected over the past decade, the exposure parameters for this experiment (power density on target and exposure durations) will not produce skin heating greater than 60 °C during a single exposure. For short durations, this temperature exceeds the pain threshold, but does not exceed the threshold for tissue damage. Even in the event of system error the maximum available power density that the system can produce at range will cause an escape response well before damaging levels of skin temperature are reached.

MMWs at this frequency are completely absorbed in the skin. The incident power density at the skin surface falls to 1/e^2 (13.5%) at a depth of 0.4 mm. For the brief exposures contemplated, much of the heat deposited in the most superficial layers of the skin is re-radiated to the environment over the next 10-20 seconds. The rest is carried away by the blood that circulates in

the skin. The fraction that is conducted to structures deeper than the skin is negligible. Thus, there is no risk of significant heating of any subcutaneous structures or organs with the exposures contemplated for these experiments.

4) On-site Monitoring: Dr. Michelle Bryce (the Medical Monitor) and/or her designated representative will evaluate the risks for potential subjects prior to their participation in the scenarios based on their responses to the medical questionnaire. Individuals with any abnormal skin or eye condition who might suffer detrimental effects from surface heating will not be allowed to participate. In addition, certain chronic medical conditions may be disqualifying at the discretion of the Medical Monitor. The Medical Monitor or her designated medical observer will examine any subject who reports an injury or concern. If eye injury is suspected, evaluation may require standard ophthalmic staining drops to be applied to the subject's eyes. Suspected ocular injury would necessitate referral to an ophthalmologist/optometrist for further evaluation. The on-site medical staff, separate from the medical observing team, will treat any non-ADS injuries and activate the emergency response system in the unlikely event of an accident or significant medical incident.

   The Medical Monitor or designee will be positioned with the Principal Investigator (PI) in the command center where they can stop the exercise if necessary. Additionally, the AFRL/HED medical team will be stationed throughout the MOUT site. Each medical observer will be equipped with head-mounted LEDs that allow examination of any subject during nighttime operations. The ADS is equipped with infrared imaging, making it possible to see the actions of the subjects in low-light or dark conditions.

   If any subjects need to be referred to local medical providers for evaluation and treatment of ADS-related effects and/or injuries, the AFRL/HED medical team will be available for consultation.

   The medical team will be available to examine/treat any subject reporting an ADS-related injury. Non-ADS injuries will be evaluated and attended to by on-site medics or will be referred to the Ft Benning medical facility and/or associated medical treatment facilities. Post-MUA medical screening will utilize a questionnaire (Attachment F). Any positive responses or concerns will be addressed and examinations will be performed as required.

10. **Medical Risk Analysis**: Although exposures may exceed permissible exposure limits specified by the relevant safety standard (AFOSH 48-9, 1997) by as much as 20-fold, we have shown in previous work, under protocols # F-BR-1998-0026-H, # F-WR-2001-0006-H, # F-BR-2002-0046, # FWR 2003-0031-H, and # FWR 2003-0028-H, that the pain tolerance limits occur well below exposure levels that produce any but the most minor effects (e.g., transient reddening and sensation of tenderness). A few subjects may tolerate longer exposures that result in minor skin damage (e.g., reddening, small blisters), which resolve within a few days without

medical treatment, leaving no sequelae. Studies by the NHRC-Det at Brooks City-Base, in collaboration with AFRL/HEDR, have shown that monkeys avert their eyes and cover their face at exposures levels much lower than that which induces corneal damage (D'Andrea et al., 2005).

Ryan et al. (2000) reviewed the health and safety issues related to exposure to MMWs. They concluded that:

1) Such exposures result only in superficial heating of the skin.
2) Such heating is very unlikely to cause damage in conscious, mobile humans, as it is readily sensed and becomes sufficiently painful to motivate escape responses long before the skin is heated enough to cause burns.
3) In the event of an overexposure to a power density sufficient to produce thermal injury, there is an extremely low probability that scars derived from such injury might later become cancerous. Proper wound management further decreases this probability, as well as the probability of hypertrophic scarring or keloid formation.

Repeated overexposure to MMWs has not been demonstrated to promote or co-promote cancer (Mason et al., 2001). Walters et al. (2000) showed that skin heating associated with painful exposure to MMWs is consistent with a simple thermal model that takes into account the shallow penetration depth at these wavelengths. These results (Walters et al., 2000) and conclusions (Ryan et al., 2000) give us confidence that the proposed exposures will produce superficial heating of the skin that is self-limiting at non-injurious levels. No damage to the eyes or surrounding structures is expected. Chalfin et al. (2002) showed that energy densities of 5 to 6 J/cm² produce a threshold for damage to the cornea that resolves within 24 hours. D'Andrea et al. (2005) have shown that monkeys and humans produce blink reflexes that protect the cornea at energy densities of about 1 J/cm², with response latencies less than 250 ms. Due to security concerns, we cannot state precisely what safety margin this provides, but it is sufficient to discount eye damage under any planned exposure scenario. Ziriax et al. (2005) have observed "hot spots" in the region of the inner canthus with direct frontal exposure of the face. Both modeling studies and human testing have shown that these "hot spots" move away and disappear with changes in orientation of the head to the beam. Such changes in orientation are expected to occur rapidly as exposed individuals perform eye aversion responses and attempt to escape the exposure. Unpublished research performed by NHRC-Det and the AFRL at Brooks City-Base, TX on possible effects of contact lenses and eye medications indicate no increased risk following ADS exposure. Subjects may make responses protective of the eyes and face while attempting to tolerate continued exposure. Some skin (e.g., eyelids) may be more vulnerable to thermal damage than other skin, so there may be a small risk of mild thermal damage (small blisters) in subjects with a high pain tolerance. Also, in rare cases where MMW energy is concentrated by reflections and constructive interference, minor thermal damage to the skin (redness that last more than a few hours and/or small blisters) may occur. Such damage should resolve within a few days without medical treatment leaving no sequelae. There have been in excess of

6414 exposures on human subjects and we have seen no psychological effects. In fact, during the Limited Military Assessment conducted in 2003, a team of psychologists interviewed subjects and reported no adverse effects.

Information for Briefing Subjects: See attached Informed Consent Document (Attachment A), Instructions for Subjects (Attachment B), Medical Screening Form (Attachment F), and Rules of Engagement (Attachment G).

Risk Assessment:

Potential Benefits: The volunteer subjects will receive no direct benefit or compensation for participation.

The volunteer subjects will benefit from direct knowledge that an effective non-lethal weapon system could soon to be in the inventory. The benefit to the DoD is more rapid acquisition of a non-lethal weapon system needed by warfigthing commanders. Human effects data are essential, not only for optimizing weapon design parameters, but also for answering questions related to policy acceptability for the use of such a weapon.

Risk-Benefit Ratio: The benefits listed above are large relative to the risks to subjects, producing an acceptable risk-benefit ratio.

11. References:

Chalfin, S., D'Andrea, J.A., Comeau, P.D., Belt, M.E., and Hatcher, D.J. (2002) Millimeter wave absorption in the nonhuman primate eye at 35 GHz and 94 GHz. Health Physics, 83:83-90.

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D'Andrea J.A., Ziriax J.M., Cox D.D., Henry P.J., and Kosub K.K. (2005) Eye Aversion To 94 GHz Radiation By Non-Human Primates (Macaca mulatta). In preparation.

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Mason, P.A., Walters, T.J., DiGiovanni, J., Beason, C.W., Jauchem, J.R., Dick, E.J., Jr, Mahajan, K., Dusch, S.J., Shields, B.A., Merritt J.H., Murphy, M.R., and Ryan, K.L. (2001). Carcinogenesis, 22, 1701-1708.

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Ziriax J.M., D'Andrea J.A., Cox D.D., Henry P.J., Blick D.W., and Hatcher D.J. (2005) Facial Sensitivity and Eye Aversion Response to Millimeter Waves in Humans. In preparation.

12. **Attachments:**

A. Informed Consent Document

B. Instructions for Subjects

C. Behavioral Questionnaire

D. Scenarios for ADS Military Utility Assessment

E. Military Utility Assessment Questionnaires

F. ADS Medical Documentation Forms

G. Rules of Engagement

INFORMED CONSENT DOCUMENT

(MOUT MUA)

Institutional Review Board Approval Dates:

PRIVACY ISSUES: Records of your participation in this study may only be disclosed in accordance with federal law, including the Federal Privacy Act, 5 U.S.C. 552a, and its implementing regulations. You understand that the sponsoring agency and/or its designee may inspect records of this study.

TITLE OF STUDY

Military Utility Assessment of the Active Denial System in an Urban Environment

INVESTIGATORS' NAMES, DEPARTMENTS, PHONE NUMBERS

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PURPOSE OF STUDY

You have been invited to participate in a research study at the McKenna Military Operations in Urban Terrain (MOUT) Facility, Ft Benning, GA, sponsored by the Air Force Test and Evaluation Center (AFOTEC) and Air Force Research Laboratory, titled "Military Utility Assessment of the Active Denial System (ADS) in an Urban Environment." The objective of this study is to assess the military utility of a new, directed energy system that uses millimeter waves to heat the skin of adversaries causing pain and forcing them to turn away from ongoing activity. This study will take about a week (not to exceed 7 days, 10 hrs/day) to complete and will be conducted using five scenarios. Each scenario will be run as many as five times (three times during the day and twice at night). Following each scenario there will be after action reports.

This study will enroll up to 270 subjects who are at least 18 years of age. You will participate in a series of scenarios designed by AFOTEC to assess military utility of the system, during which you will be exposed to the millimeter wave beam of the ADS. Prior to your participation in the scenarios, you will be given orientation and safety briefings, and a medical prescreening questionnaire. After your participation in these scenarios, you will be asked to complete questionnaires aimed at assessing your attitudes, beliefs, and assumptions about the ADS. Additionally, after each scenario, you will be asked if you have any concerns or questions about the exposures received and if you need to see someone on our medical team.

PROCEDURES

If you volunteer to participate in this study, you may be exposed to millimeter waves during the course of the scenarios at intensities that will exceed the applicable exposure standards by as much as 20-fold. This exposure could cause your skin temperature to rise to 60 °C and will cause pain forcing you to take evasive action to escape the beam. AFOTEC has developed scenarios to assess the military utility of ADS and you will be assigned to play the role of: 1) security force person, 2) non-combatant, or 3) threat adversary. Before the start of your participation, you will be asked to fill out a medical questionnaire and may be questioned by medical personnel. A medical examination with photos may be required. Individuals who have had refractive eye surgery (PRK, LASIK) or are pregnant will not be allowed to participate. Women who are unsure if they are pregnant will be given a pregnancy test.

The participants will be broken into three groups. For each scenario iteration, there will be combatants (Red Force), security forces, and non-combatants. During these scenarios, you may be exposed to the ADS beam deliberately (if you are playing the adversary) or collaterally (if you are a non-combatant or if you are assigned to the security forces). If you are exposed, pain is likely to quickly become so intense that you will be forced to take evasive action to escape the pain, either by involuntary reflex or because you feel that the pain has reached your tolerance limit.

All scenarios will be run up to five times (three times during day light and twice after dark). The Traffic Control Point Cordon & Search scenario will consist of 10 Red Force, 25 Security Force, and 15 non-combatant members. The Defense of Terrain scenario will employ 20 Red Force members, 25 Security Force members, and 20 non-combatants. The Breach of Obstacle scenario will use 10 Red Force members, 35 Security Forces, and 10 non-combatants. In the Route/Area Clearance scenario, 25 Security Forces will defend against 10 Red Force members. As many as 10 non-combatants will participate in this scenario. The final scenario represents a Search and Rescue (SAR) Mission with 25 Security Forces, 10 Red Forces, and 20 non-combatants. In all cases, the numbers listed above represent the maximum number of participants. Group assignments will be made prior to the beginning of the exercise.

Table 1. Subject Allotments

Scenario	Security Force	Red Force	Non-Combatants
Traffic Control Point	25	10	15
Defense of Terrain	25	20	20
Breach of Obstacle	35	10	10
Route/Area Clearance	25	10	10
Search and Rescue	25	10	20

The principal investigator or her designee and the Medical Monitor or her designee will be in the command center so that they can easily stop the use of ADS if necessary. The AFRL/HED medical team will be present on site to assess your safety and be available for treatment throughout the exercise. Medical observers on site will be in communication with the principal investigator and exercise director so that they can remove you from the exercise and/or terminate the use of ADS if deemed necessary. Additional medics, independent of the

AFRL/HED medical team, will be available on site to evaluate and treat non-ADS related injuries.

The fluence for each exposure will not exceed a combination pf power and duration of 12 Joules/cm^2 (e.g., a 1.5 W/cm^2 exposure will not last longer that 8 sec). In all cases, you can further limit your exposure by moving out of the beam. This exposure cap will be ensured by well-defined operating parameters executed through the rules of engagement, operating checklists, trained operators, and quality control, as well as the software controls built into the system. To verify the peak power of the beam, a carbon-impregnated Teflon or KAPTON plate, the surface of which heats at rates similar to the skin, will be exposed and the heating distribution will be measured by infrared (IR) thermography prior to the start of each test day.

Video images will be recorded with cameras on the beam boresight as well with cameras located in the vicinity of the scenario. In some instances, you may be imaged using IR thermography. The video images will be time marked with the onset of beam activation.

If you want to halt your participation during a scenario, raise your hands over your head and run out of the playing area. You must count to 15 before resuming your participation in the scenario. The operator and field supervisor will coordinate to not reengage you as a target until after these 15 sec have passed. This will allow the temperature of your skin to cool down. Depending on your role, you may be exposed multiple times to the ADS energy. The scenarios may be video taped and, in certain instances, infrared images will be recorded. These recordings will allow the research team to evaluate how groups of people behave when exposed to ADS. The video may be presented to DoD decision makers and others interested in the technology. It will be maintained at a security level of "For Official Use Only" by the ADS team for a period of 10 years.

If an exposure produces skin pain or tenderness that last for more than 2 hours, you will contact a medic or one of the investigators and your further participation may be terminated. If you feel discomfort in the eyes or the skin around the eyes for more than a few minutes, you should report it to one of the investigators or medical observer staff. You should feel free to report **any** medical concerns/problems to one of the investigators or a member of the medical staff at any time throughout the experiment. If you have any unusual skin conditions or have had refractive eye surgery that might be aggravated by surface heating, you should decline participation in this experiment. Although not anticipated, if an eye injury is suspected, you may be referred for further evaluation. **You are free to discontinue participation at anytime.**

After you have completed your participation in this study, you will be asked to complete a questionnaire designed to assess your thoughts, attitudes, feelings, and reactions to the weapon and to the exposure experiences. This will take place while you are in a group setting with other volunteers, but you will fill out the questionnaire without discussing your reactions or responses with others. During the after action reviews you will be invited to participate in a group debriefing to interact and discuss any thoughts, feelings, concerns, or suggestions about ADS. You will also be asked to fill out a medical questionnaire and may require further evaluation by the Medical Monitor or her designee. An examination and photos may be required. The purpose of these photos is to document any pre-existing conditions or injuries. The photos will be stored by the Principal Investigator for a period not to exceed five years. These photos will not be published for any reason without your written consent.

RISKS/INCONVENIENCES

Participation involves a risk of skin reddening. The affected area might remain slightly tender and red for several minutes after exposure. It has been our experience that in rare cases (less than 1%) mild redness or even very small blisters may persist for a few days (up to 72 hours), but these resolve completely without requiring any medical treatment. If the skin remains painful and tender for more than two hours after exposure, this should be reported to the investigator or medical staff, and the medical staff will then examine you. Eye complaints or concerns that last longer than a few minutes should also be reported. If eye injury is suspected, evaluation may require standard eye staining drops to be applied to your eyes. Suspected injury would necessitate referral to an ophthalmologist/optometrist for further evaluation. Some subjects who tolerate extreme skin heating may develop mild skin reddening or skin blisters, which will heal within a few days without medical treatment, leaving no aftereffects or scarring. You are completely free to decline participation or to terminate your voluntary participation at any time. Many scientific studies have looked for possible adverse effects (for example: skin cancer, damage to the cornea of the eye, male infertility) of exposure to microwave energy (which includes millimeter waves). Except for the heating effects, there are no known biological effects (good or bad) of exposure to millimeter waves. We have been using human subjects for 12 years and have seen no long-term health effects in these subjects. It is highly unlikely that brief heating of the skin to painful, but non-damaging, temperatures, will have any short- or long-term adverse effects, but we have no research data beyond our 12 years of experience and therefore effects beyond this timeframe are unknown. The research has been reviewed by the Human Effects Advisory Panel (an independent panel of Blue Ribbon experts), the DoD's Human Effects Review Board, the Armed Forces Epidemiological Board, OSD's Tri-Service Electromagnetic Radiation Panel, and the Senior Military Medical Advisory Council. In all cases, the reviewers agreed with the interpretation of the results. 95GHz energy is non-ionizing and does not break DNA bonds, therefore it cannot initiate cancer. Normal reflexes (closing the eyes, turning the head, protecting the eyes with a hand) will protect the eyes from heating that might otherwise cause damage.

PRECAUTIONS FOR FEMALE SUBJECTS

You may not participate in this study if you are pregnant. There is some concern that you could stumble and fall as you are rapidly moving away from the beam. Although there currently is no evidence that exposure to millimeter waves of this type could affect a fetus, the research investigating this issue is still ongoing. Therefore, if you are a female of childbearing potential, and are not certain whether or not you are pregnant, you should consult with the Medical Monitor, who may ask you to take a pregnancy test.

BENEFITS

Subjects will receive no direct benefit or compensation for participation.

The data collected during these studies will assess the military utility of the ADS that will lead to its eventual fielding for security forces.

ALTERNATIVES

Choosing not to participate is an alternative to volunteering for this study.

EVENT OF INJURY

Federal laws and regulations govern your entitlement to medical care and/or compensation in the event of injury. If you have questions about your rights or if you believe you have received a research-related injury, you should contact the Medical Monitor, Lt Col Michelle Bryce, USAF, MC, SFS, (office 210-536-4007 (DSN 240-4007)), Principal Investigator, Stephanie Miller (office

210-536-3881, (DSN 240-3881), cell 210-421-1216) or one of the investigators listed at the top of this document.

Should you be injured as a direct result of being in this study, you will be provided medical care for that injury at no cost. You will not receive any compensation (payment) for injury. This is not a waiver or release of your rights. Medical care is limited to the care normally allowed for Department of Defense health care beneficiaries (patients eligible for care at military hospitals and clinics). Necessary medical care does not include in-home care or nursing home care. In case of any medical incident, you will be treated on site, unless personnel on site judge it to be an emergency, in which case they will call for ambulance service. Non-ADS related injuries will be cared for at the site or will be referred to the Ft Benning medical facility and/or associated medical treatment facilities.

OCCURRENCE OF UNANTICIPATED ADVERSE EVENT

If an unanticipated event occurs during your participation in this study, you will be informed immediately. If you are not competent at the time to understand the nature of the event, such information will be brought to the attention of your Next of Kin.

Next of Kin: Name_____ Phone # _____

CONFIDENTIALITY

When the results of the research are published or discussed in conferences, no information will be included that would reveal your identity. To maintain your anonymity, only subject number will used to identify medical and psychological documentation. Names will not be associated with subjects captured on video images. Identities will not be blurred. Complete confidentiality cannot be promised, because information regarding your health may be required to be reported to appropriate medical or command authorities. Furthermore, due to the transformational nature of this technology, the DoD has developed a surveillance plan for all those exposed to MMW energy. The Principle Investigator will place your name, contact information and exposure conditions in a database that will be kept separate from your experimental data. The photos will be stored by the Principal Investigator for a period not to exceed five years. These photos will not be published for any reason without your written consent. The video may be presented to DoD decision makers and others interested in the technology. It will be maintained at a security level of "For Official Use Only" by the ADS team for a period of 10 years.

DECISION TO PARTICIPATE

The decision to participate in this research is completely voluntary on your part. Refusal to participate will involve no penalty or loss of benefits to which you are entitled, and you may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. One of the investigators will answer questions you have about this study, your participation, and the procedures involved. One or more of these investigators will be available to answer any questions concerning procedures throughout this study. If significant new findings develop during the course of this research that may relate to your decision to continue participating, you will be informed. You may withdraw this consent at any time and discontinue further participation in this study without prejudice to your entitlements. The

investigators may terminate your participation at any time, and the Medical Monitor or Medical Observer of the study may terminate your participation if they feel this to be in your best interest.

SUBJECT STATEMENT:

I have read the document "Instructions for Subjects— Military Utility Assessment of the Active Denial System in an Urban Environment." I have read all of the above. My questions have been answered concerning areas I did not understand. I am willing to take part in this study. After I sign this form, I will receive a copy.

Full Name: _____ _____ _____

(Please Print) SSN (optional) Telephone Number

_____ _____

Volunteer Signature Date and Time

_____ _____

Investigator Date

_____ _____

Witness (not involved) Date

Privacy Act Statement

Authority: We are requesting disclosure of personal information, to include your Social Security Number. Researchers are authorized to collect personal information (including social security numbers) on research subjects under The Privacy Act-5 USC 552a, 10 USC 55, 10 USC 8013, 32 CFR 219, 45 CFR Part 46, and EO 9397, November 1943 (SSN).

Purpose: It is possible that latent risks or injuries inherent in this experiment will not be discovered until some time in the future. The purpose of collecting this information is to aid researchers in locating you at a future date if further disclosures are appropriate.

Routine Uses: Information (including name and SSN) may be furnished to Federal, State and local agencies for any uses published by the Air Force in the Federal Register, 52 FR 16431, to include, furtherance of the research involved with this study and to provide medical care.

Disclosure: Disclosure of the requested information is voluntary. No adverse action whatsoever will be taken against you, and no privilege will be denied you based on the fact you do not disclose this information. However, your participation in this study may be impacted by a refusal to provide this information.

Instructions for Subjects – MOUT MUA

In order to assess the military utility of the Active Denial System (ADS) in an Urban Environment, you will be assigned to play a role in various field scenarios. You will be dressed/equipped appropriately for this role.

AFOTEC personnel will brief you with regard to the rules of engagement for the scenario and assign you a role. You may be deliberately or incidentally exposed to the ADS beam during play. If you are exposed, we expect that the pain will become so intense that you will take evasive action, either because of an involuntary reflex withdrawal, or because the pain reaches your tolerance limit and you want to move to end it. If you want to halt your participation during a scenario, raise your hands over your head and run out of the playing area. You must count to 15 (approximately 15 sec) before resuming your participation in the scenario. This will allow your skin to cool down. You may feel a "burning" sensation that lingers for a few seconds. The exposed area may also feel tender for a few minutes. We expect that these conditions will disappear within an hour or two at most. If the skin is still painful or tender after two hours, you should notify a member of the investigator team, who will arrange for the medical staff to examine you and apply appropriate treatment. Any eye discomfort or concerns that last longer than a few minutes should also be reported. There is no reason to expect any aftereffects more serious than a mild sunburn or a few small blisters. In contrast to a sunburn, which entails some long-term risk from the effects of ultraviolet exposure, millimeter waves have no known long-term effects.

You should NOT be afraid of the exposures. The most that might happen is that you could be forced to escape the millimeter waves because the pain becomes too intense. The minimal skin damage that may occur (reddening, tenderness) should not last more than a few minutes to a few hours. Some subjects who tolerate the most heating may experience minor damage to the skin (for example, redness and small blisters). This occurs rarely. If it should occur, it will clear up within a few days without medical treatment, leaving no aftereffects.

Please feel free to ask any questions or express any concerns regarding this experiment.

Questionnaire

MUA Participant. The following questions ask you to evaluate your reactions to the ADS. Please read each statement below and check the box that most applies to your level of agreement.

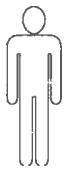
Subject #_____ Scenario _____ Date _____

Have you experienced the effects of ADS previously? Yes ☐ No ☐

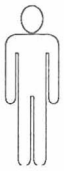
In the present scenarios, were you engaged by the ADS beam? Yes ☐ No ☐

If so, about how many times do you think you were engaged by the ADS beam? _____

If so, how directly were you engaged? Directly ☐ Peripherally ☐



Front



Back

Shade the area(s) of your body hit by the ADS beam.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree	
The sensation of ADS was unbearable.	☐	☐	☐	☐	☐	☐	
When engaged by the ADS I moved out of the beam.	☐	☐	☐	☐	☐	☐	
After engagement with the weapon I knew that my plan of attack would have to change.	☐	☐	☐	☐	☐	☐	
When I saw a teammate react to the ADS I changed my strategy.	☐	☐	☐	☐	☐	☐	
The sensation of ADS was easy to take.	☐	☐	☐	☐	☐	☐	
When engaged by the ADS I fell back to a safe place.	☐	☐	☐	☐	☐	☐	
When I felt the sensation of ADS I was not deterred from my mission.	☐	☐	☐	☐	☐	☐	
At no time did I think I should change my plan of attack.	☐	☐	☐	☐	☐	☐	

Attachment C –Behavioral Questionnaires

I got used to the pain from ADS.	☐	☐	☐	☐	☐	☐	
The ADS only served to irritate me.	☐	☐	☐	☐	☐	☐	
After engagement with the weapon I gave up.	☐	☐	☐	☐	☐	☐	
After several engagements with the ADS I decided to avoid the areas where I had been engaged.	☐	☐	☐	☐	☐	☐	
After several engagements with the ADS I developed strategies to deal with the pain.	☐	☐	☐	☐	☐	☐	
Before I was engaged by the ADS I was fiercely determined to accomplish my mission.	☐	☐	☐	☐	☐	☐	
After I was engaged by the ADS I was fiercely determined to accomplish my mission.	☐	☐	☐	☐	☐	☐	
When I felt the sensation of ADS I was more determined to reach my goal.	☐	☐	☐	☐	☐	☐	
This weapon did not stop me from trying to successfully complete my mission.	☐	☐	☐	☐	☐	☐	
The ADS was more of a deterrent than the Control Force.	☐	☐	☐	☐	☐	☐	
I thought ADS was an effective deterrent.	☐	☐	☐	☐	☐	☐	
The ADS was easily defeated.	☐	☐	☐	☐	☐	☐	
Not knowing where the ADS was stationed created confusion.	☐	☐	☐	☐	☐	☐	

Comments

Background Information Items

1. Age: _____

2. Gender (please check): _____ Male _____ Female

3. Duty Status (please check only one):
   - _____ Active Duty
   - _____ Reserve
   - _____ National Guard
   - _____ Military Retired
   - _____ Civil Service
   - _____ Contractor

4. Branch of Service (please check): _____ Army _____ Navy
   _____ Air Force _____ Marines

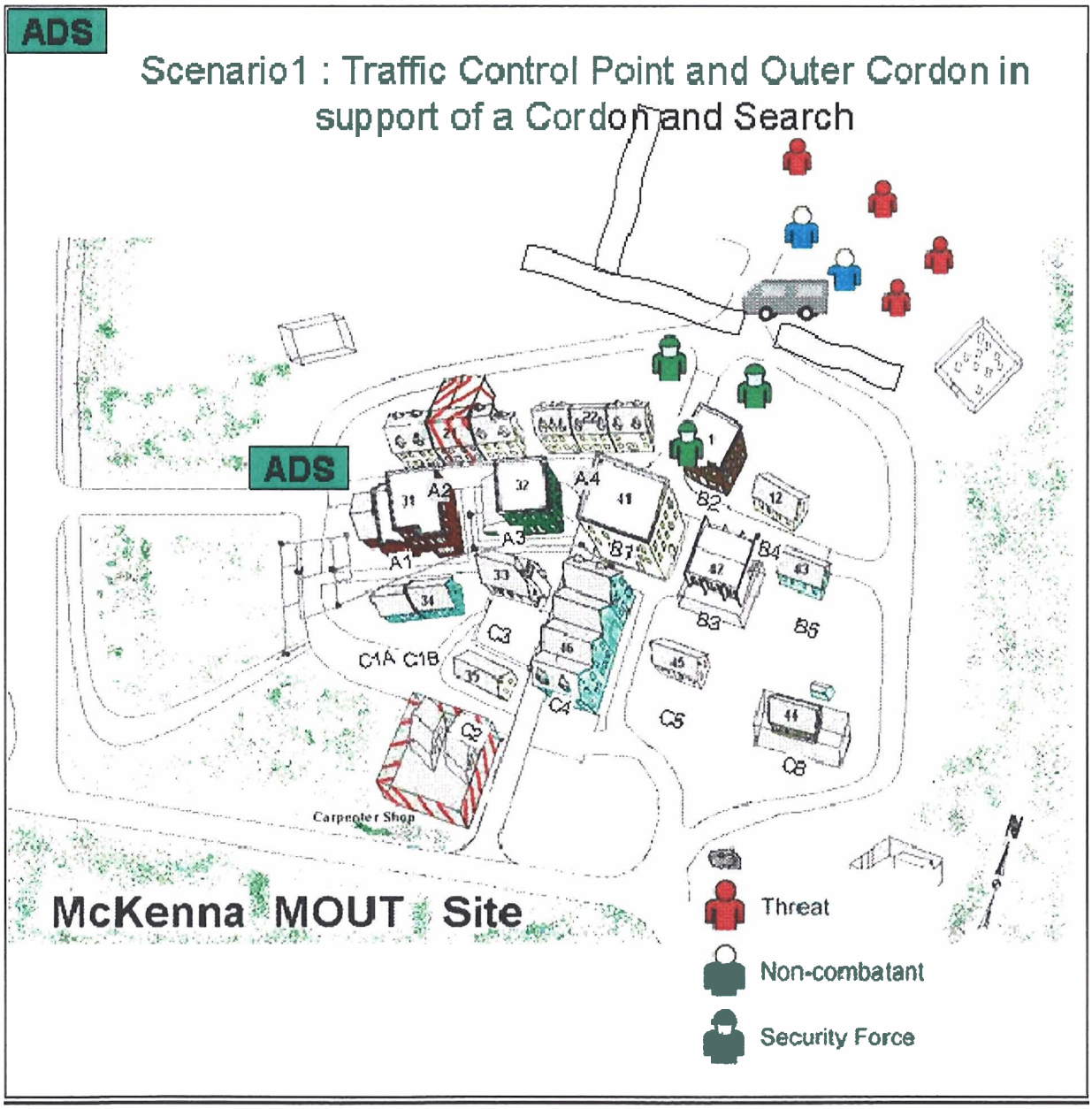
5. Occupation/Military Occupational Specialty (please spell out):
   _____

6. Time in Service (in years and/or months): _____

7. Highest Education Level (please check):
   - _____ High School
   - _____ Some College
   - _____ BS/BA
   - _____ Masters
   - _____ Doctorate
   - _____ Other (please state): _____

ADS Scenarios for Military Utility Assessment at **the McKenna MOUT Facility, Ft Benning, GA**

Scenario 1: Traffic Control Point (TCP) and Outer Cordon in Support of a Cordon and Search



Part A:

Your battalion is operating in McKenna Village. Most villagers fled prior to the occupation and are now beginning to return. Your company and platoon have been tasked with controlling the flow of traffic into the village. Signs are clearly written in English and the host nation language instructing people to leave their vehicles 1000 meters outside of the village.

Wire barriers will slow the incoming traffic and will direct civilians on foot into an orderly column.

Critical to this mission is the proper employment of the ADS given a mission, terrain and weather, enemy, time, troops available, and civil consideration (MTETTC) analysis. The most important factor of this analysis is the limit terrain (range and intervisibility lines) imposes on the weapon system.

A vehicle has begun to negotiate through the wire barriers. Hostile intent has not been shown. It is possible this is an illiterate national. He must be stopped prior to reaching the TCP. It appears he has a family in his vehicle. A group of nationals has also gathered at the vehicle drop off point and is acting suspiciously. It appears they are concealing something.

The proper use of the ADS denies the enemy access to the village and limits collateral damage to local nationals. The most important effect of this action is the prohibition of hostile entry into the village.

Part B:

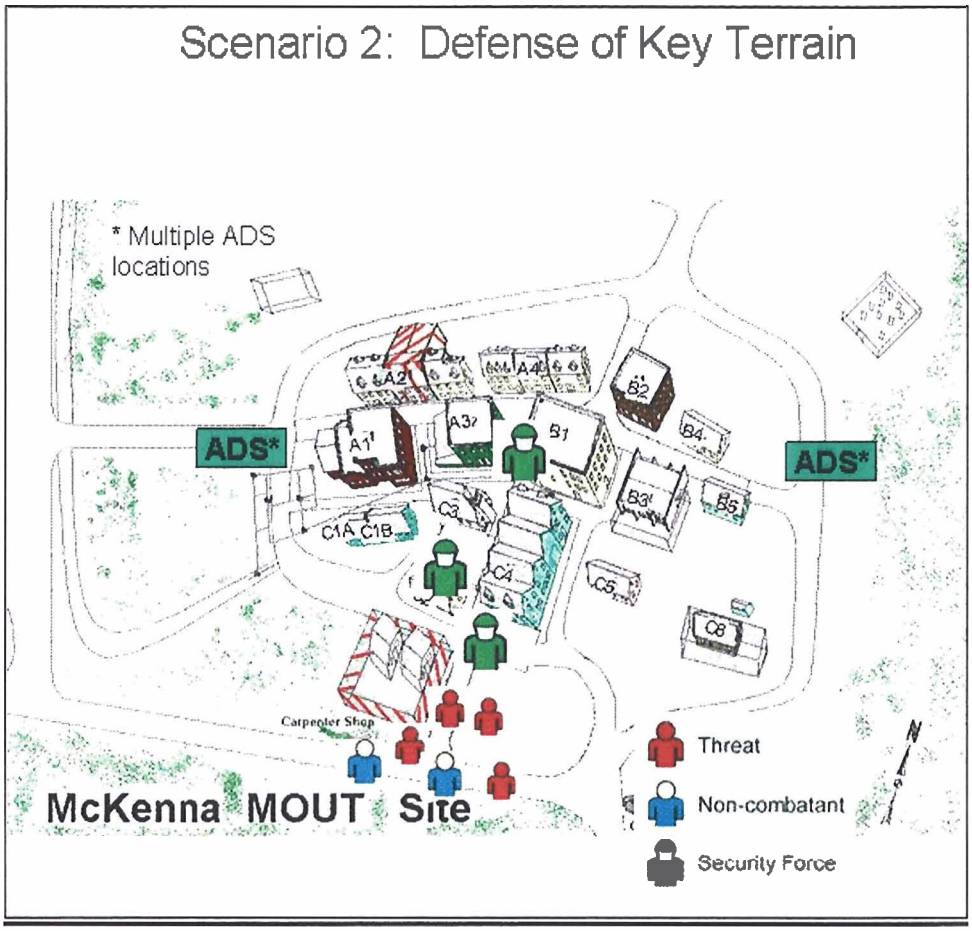
Your battalion is conducting a cordon and search of McKenna Village. Your company and platoon area of operations (AOs) have been identified. You are the 1st platoon platoon leader (PL) and you are tasked with denying outside influence from the north side of the village.

Critical to this mission is the proper employment of the ADS given a MTETTC analysis. The most important factor of this analysis is the limits terrain (range and intervisibility lines) imposes on the weapon system.

Unidentified personnel are approaching the village from the north. They do not respond to verbal warnings or visual signs. It is uncertain whether these personnel are friendly or enemy.

The proper employment of the ADS denies enemy access to the village and limits collateral damage to local nationals. The most important effect of this action is the cordon and search is conducted excluding outside influence.

Scenario 2: Defense of Key Terrain



Your battalion has occupied McKenna Village while conducting Stability and Support Operations. Your company has occupied building B1 which is the location of the battalion civil military operations center (CMOC). You are the 1st platoon PL and you are tasked with providing securing for this building.

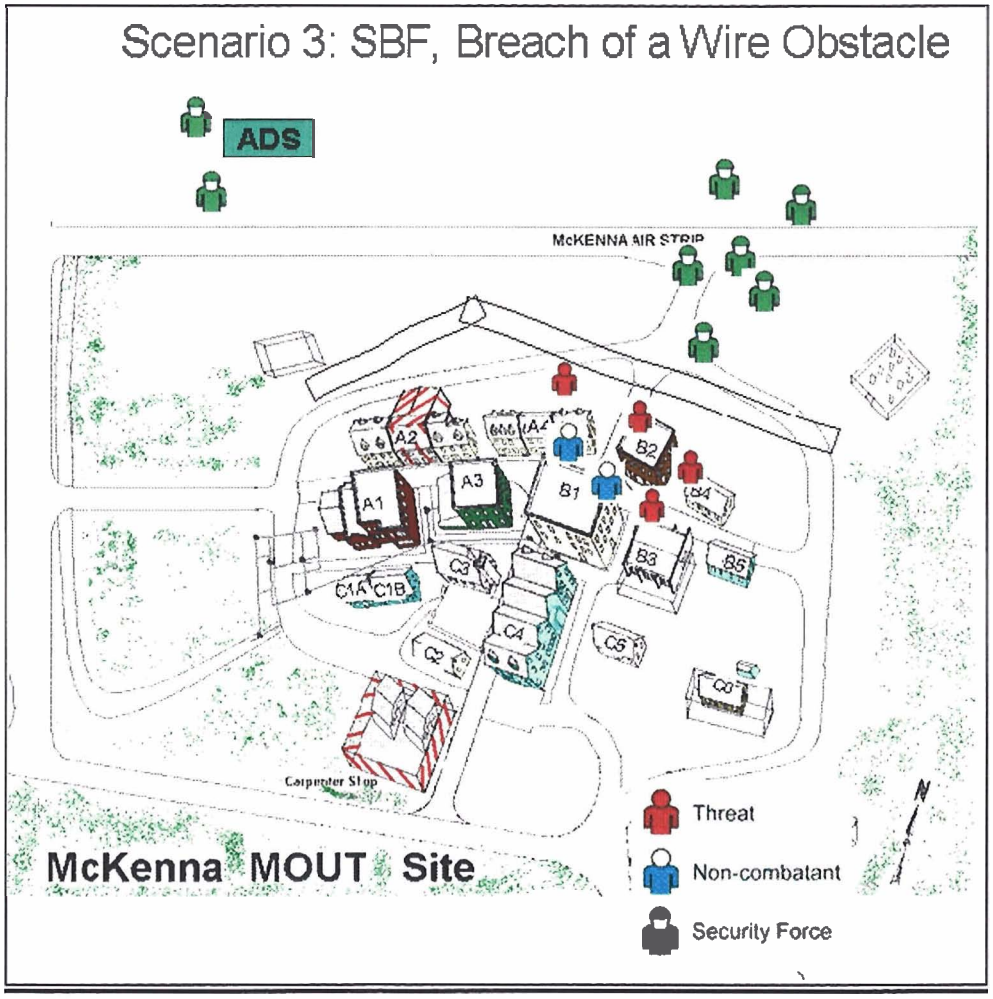
Your interpreter has told you that the noon message from the local mosque called for a demonstration in front of building B1. Intelligence reports that insurgents will attempt to infiltrate the demonstration. Anticipate between 20-30 unruly personnel.

Critical to this mission is the proper employment of the ADS given a MTETTC analysis. The most important factor of this analysis is the limits terrain (range and intervisibility lines) imposes on the weapon system.

Unidentified personnel are approaching the building from the south. They are moving in a pack and are chanting loudly. They do not respond to verbal warnings or visual signs. It is uncertain whether these personnel are friendly or enemy.

The proper employment of the ADS denies enemy access to the village and limits collateral damage to local nationals. The most important effect of this action disruption of the riot and the safety of the CMOC.

Scenario 3: Support by Fire (SBF), Breach of a Wire Obstacle



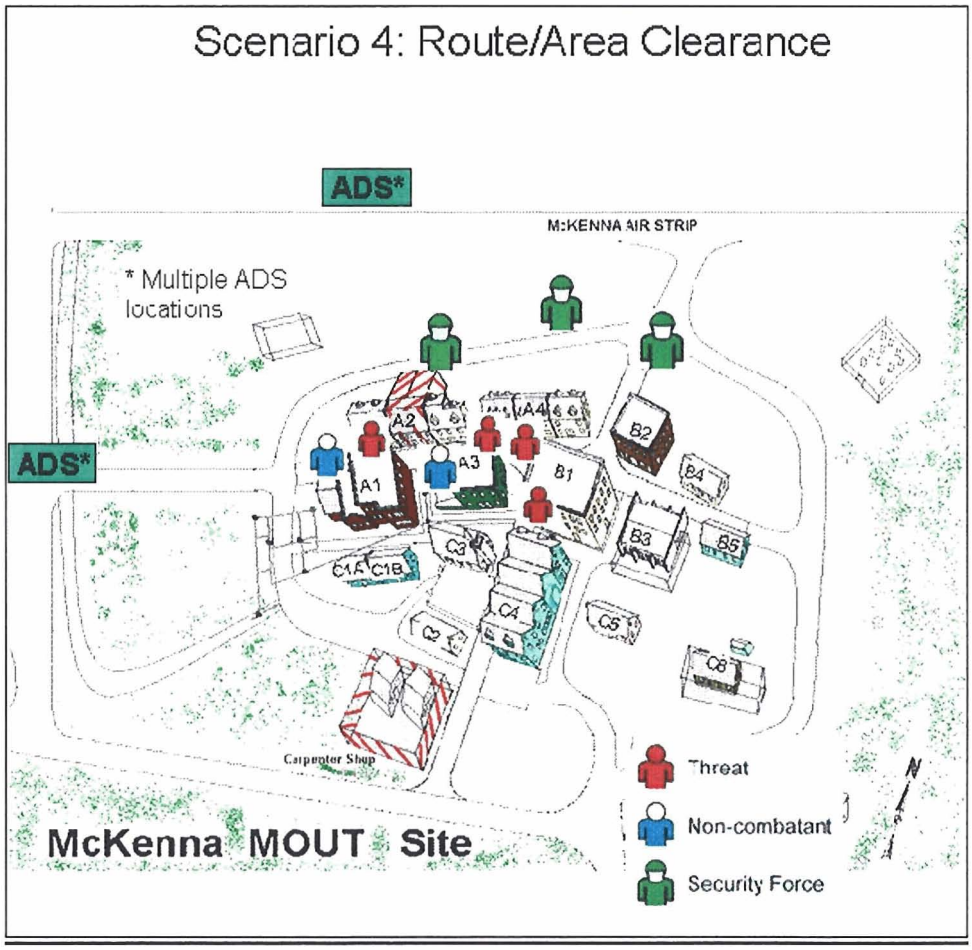
Your platoon has been tasked to breach a wire obstacle and seize key terrain beyond it.

At the present time your platoon is organized into support, breach, and assault elements. The SBF position is established. The ADS is employed first to deny the enemy effective use of their weapons. Meanwhile, the breach and assault elements are approaching along a route away from the ADS field of fire. With the proper use of control measures and signals, the ADS ceases fire after the breach is achieved and the assault element is maneuvering forward to seize key terrain.

Upon seizure of key terrain, the ADS moves forward with the consolidation of forces and is positioned to assist in preparing for a counterattack. Consider the limits terrain

imposes on the weapon system and employ to maximize its effectiveness. The ADS can be pushed out to one terrain feature forward from the objective with security to deny the counterattack effective use of terrain. The ADS can also delay/disrupt the counterattack's maneuver upon friendly forces.

Scenario 4: Route/Area Clearance



Your battalion is conducting a raid on building B1 within McKenna Village. Your company is the supporting effort and must set the conditions for the assault. You are the 1st platoon PL and you are tasked with clearing mounted avenues of approach from west to east in order to prevent the enemy from influencing the battalion main effort.

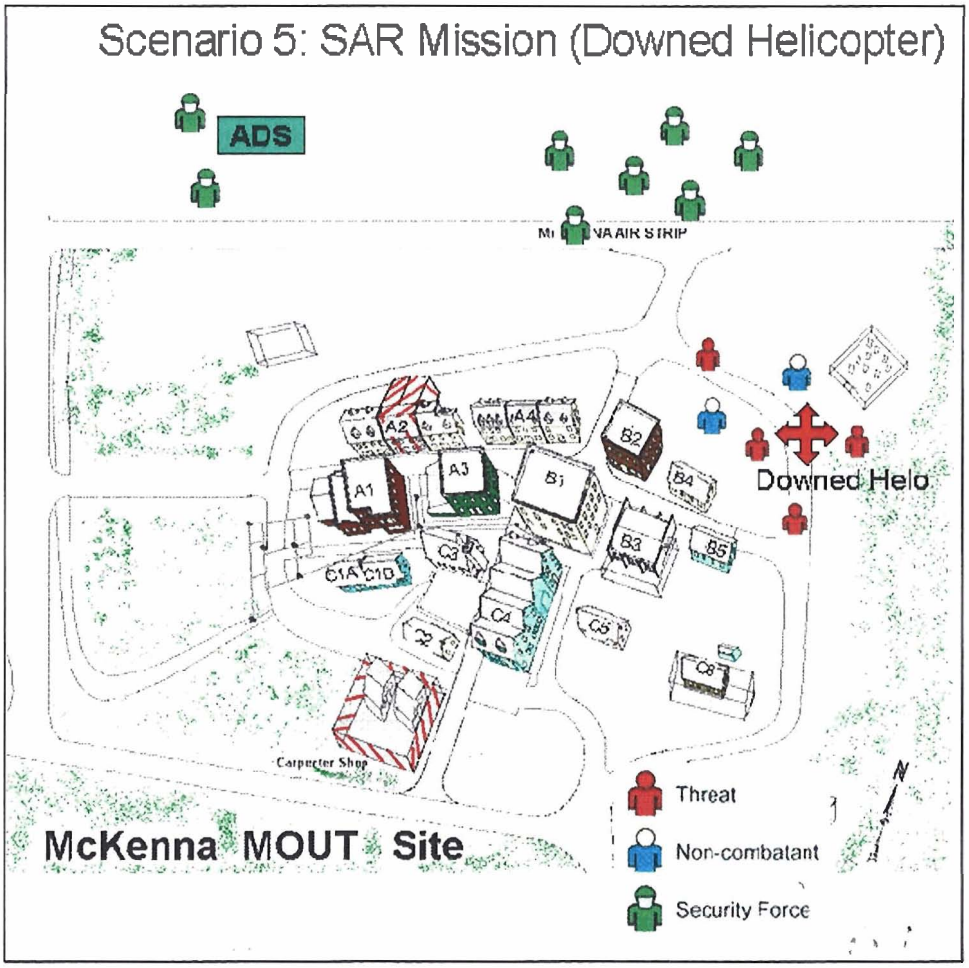
Critical to this mission is the use of the ADS. The most important factor of this analysis is the limits terrain (range and intervisibility lines) imposes on the weapon system.

Unidentified personnel are moving within buildings A1 through A4. They do not respond to verbal warnings or visual signs. It is uncertain whether these personnel are

friendly or enemy. Some personnel have been observed carrying weapons. At this time, none of the weapons have been fired or aimed at US forces.

The proper employment of the ADS denies the enemy freedom of movement along the avenue of approach. The ADS will disrupt enemy movement and remove neutral civilians from the battlefield.

Scenario 5: Search and Rescue (SAR) Mission (Downed Helicopter)



Your platoon has been tasked with a SAR mission of a down helicopter in you sector

At the present time it is not clear if the crash was due to hostile fire. Locals are massed around the wreckage and several are starting to steal parts off the aircraft. It is not certain if any friendly forces survived the crash.

Critical to this mission is the use of the ADS. The most important factor of this analysis is the limits terrain (range and intervisibility lines) imposes on the weapon system.

The proper employment of the ADS denies the enemy freedom of movement along the avenue of approach. The ADS will disrupt enemy movement and remove neutral civilians from the crash site.

Demographic Questionnaire

You are an important part of the evaluation of the Active Denial System. You represent those individuals who may use the system. The information you provide will not be released outside the scope of this Advanced Concept Technology Demonstration (ACTD).

Your job during this demonstration event (operator, red team, Security Forces team, noncombatant, etc.) _____

_____

Do you have any experience with any other crowd control equipment or system? **YES / NO**

If yes, which systems and how many months experience?

Equipment/System	**Experience**
_____	_____ months
_____	_____ months
_____	_____ months
_____	_____ months

Please describe any previous experience you have had with any crowd control equipment or systems (type of system, employment, location, conditions, etc.)

_____

_____

_____

Operational Utility Questionnaire

Operator / Observer. The following questions ask you to evaluate the operational utility of the ADS. Please read each statement below and check the box that most applies to your level of agreement.

Scenario _____ Date _____

Have you experienced the effects of ADS? (Y / N)

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
The ADS situational awareness is adequate to locate and track targets.	☐	☐	☐	☐	☐	☐
ADS controls are well positioned and easy to understand.	☐	☐	☐	☐	☐	☐
During target engagement, ADS easily maintains track throughout required dwell time.	☐	☐	☐	☐	☐	☐
ADS can quickly track and engage multiple targets.	☐	☐	☐	☐	☐	☐
I can identify targets from a long range.	☐	☐	☐	☐	☐	☐
I can engage targets from a long range.	☐	☐	☐	☐	☐	☐
The ADS is easy to use.	☐	☐	☐	☐	☐	☐
ADS is an effective deterrent in crowd control situations.	☐	☐	☐	☐	☐	☐
ADS can affect the movement of a crowd.	☐	☐	☐	☐	☐	☐
ADS can separate specific elements of a crowd.	☐	☐	☐	☐	☐	☐
ADS is effective at driving a group in a desired direction.	☐	☐	☐	☐	☐	☐
Because the ADS is non-lethal, I am not concerned about unintended targets.	☐	☐	☐	☐	☐	☐
ADS does not cause unintended effects, such as dangerous crowd movements.	☐	☐	☐	☐	☐	☐
ADS is operationally useful and fills a void in current crowd control situations.	☐	☐	☐	☐	☐	☐
The reaction of an ADS target clearly indicates successful engagement.	☐	☐	☐	☐	☐	☐

The reaction of an ADS target is immediate.	☐	☐	☐	☐	☐	☐
The target's activities are unmistakably disrupted when engaged with ADS.	☐	☐	☐	☐	☐	☐
The target's activities are immediately disrupted when engaged with ADS.	☐	☐	☐	☐	☐	☐
Most targets don't resume original activities after ADS engagement.	☐	☐	☐	☐	☐	☐
ADS will easily compliment other existing crowd control techniques.	☐	☐	☐	☐	☐	☐
ADS can engage simultaneous targets.	☐	☐	☐	☐	☐	☐
ADS can easily reengage targets.	☐	☐	☐	☐	☐	☐
ADS interacts well with other crowd control measures.	☐	☐	☐	☐	☐	☐
TTPs support full engagement of ADS.	☐	☐	☐	☐	☐	☐
The ADS briefings and subsequent training adequately prepared me to operate the system.	☐	☐	☐	☐	☐	☐
The ADS contractor provided the correct level of support during the initial and follow-on training.	☐	☐	☐	☐	☐	☐
The correct amount of time was budgeted for training.	☐	☐	☐	☐	☐	☐
The overview and training presented would prepare a typical user to operate the ADS.	☐	☐	☐	☐	☐	☐
The ADS does not require any special skills to operate.	☐	☐	☐	☐	☐	☐
Overall, the ADS is user-friendly.	☐	☐	☐	☐	☐	☐

Comments: _____

_____

_____

_____

_____

Operational Utility Questionnaire

MUA Participant. The following questions ask you to evaluate the operational utility of the ADS. Please read each statement below and check the box that most applies to your level of agreement.

Scenario _____ Date _____

Have you experienced the effects of ADS? (Y/ N)

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
My reaction to the ADS energy beam was uncontrollable.	☐	☐	☐	☐	☐	☐
My reaction to the ADS energy beam was immediate.	☐	☐	☐	☐	☐	☐
After being engaged by the ADS energy beam I was unable to continue my activities.	☐	☐	☐	☐	☐	☐
A motivated person could complete a quick task while engaged by the ADS energy beam.	☐	☐	☐	☐	☐	☐
I could not tell what direction the ADS beam was coming from.	☐	☐	☐	☐	☐	☐
ADS is an effective deterrent in crowd control situations.	☐	☐	☐	☐	☐	☐
ADS can affect the movement of a crowd.	☐	☐	☐	☐	☐	☐
ADS can separate specific elements of a crowd.	☐	☐	☐	☐	☐	☐
ADS is effective at driving a group in a desired direction.	☐	☐	☐	☐	☐	☐
Because the ADS is non-lethal, I am not concerned about unintended targets.	☐	☐	☐	☐	☐	☐
ADS does not cause unintended effects, such as dangerous crowd movements.	☐	☐	☐	☐	☐	☐
ADS is operationally useful and fills a void in current crowd control situations.	☐	☐	☐	☐	☐	☐
The reaction of an ADS target clearly indicates successful engagement.	☐	☐	☐	☐	☐	☐
The reaction of an ADS target is immediate.	☐	☐	☐	☐	☐	☐

The target's activities are unmistakably disrupted when engaged with ADS.	☐	☐	☐	☐	☐	☐
The target's activities are immediately disrupted when engaged with ADS.	☐	☐	☐	☐	☐	☐
Most targets don't resume original activities after ADS engagement.	☐	☐	☐	☐	☐	☐
ADS will easily compliment other existing crowd control techniques.	☐	☐	☐	☐	☐	☐
ADS can engage simultaneous targets.	☐	☐	☐	☐	☐	☐
ADS can easily reengage targets.	☐	☐	☐	☐	☐	☐
ADS interacts well with other crowd control measures.	☐	☐	☐	☐	☐	☐
TTPs support full engagement of ADS.	☐	☐	☐	☐	☐	☐
The ADS briefings and subsequent training adequately prepared me to operate the system.	☐	☐	☐	☐	☐	☐
The ADS contractor provided the correct level of support during the initial and follow-on training.	☐	☐	☐	☐	☐	☐
The correct amount of time was budgeted for training.	☐	☐	☐	☐	☐	☐
The overview and training presented would prepare a typical user to operate the ADS.	☐	☐	☐	☐	☐	☐
The ADS does not require any special skills to operate.	☐	☐	☐	☐	☐	☐
Overall, the ADS is user-friendly.	☐	☐	☐	☐	☐	☐

Comments: _____

_____

_____

_____

_____

ADS MEDICAL SURVEY FORM

Military Utility Assessment at McKenna MOUT Facility, Ft Benning, GA

DATE: _____ **Subject #** _____

1. Are you or might you be pregnant?	No	Yes
NOTE: If you are or might be pregnant report to one of the medics		
2. Do you currently have any eye complaints?	No	Yes
3. Do you feel as though you have something is in your eye?	No	Yes
4. Do you have any eye burning, dryness, discharge?	No	Yes
5. Do you have an impaired blink reflex?	No	Yes
6. Have you had eye surgery (PRK, LASIK, etc)?	No	Yes
7. Are you wearing contact lenses?	No	Yes
NOTE: If you have had eye surgery report to one of the medics		
8. Do you have diabetes?	No	Yes
9. Do you have a sunburn?	No	Yes
10. Do you have a skin condition?	No	Yes
11. Do you have a history of skin cancer?	No	Yes
12. Have you had skin grafts?	No	Yes
13. Do you have any thick scars?	No	Yes
14. Are you photosensitive?	No	Yes
15. Do you have cancer?	No	Yes
16. Do you have numbness and/or tingling?	No	Yes
17. Do you have uncontrolled high blood pressure?	No	Yes
18. Have you had a stroke?	No	Yes

19. Do you have heart problems? No Yes

20. Do you have an on-going disease? No Yes

If so, what?

_____

_____

21. List current medications (including eye medication):

_____

_____

_____

_____

Rules of Engagement

Operator

The combination of power density and shot duration shall not exceed 12 Joules/cm^2 for any single shot.

Any subject with their hands up shall not be engaged.

Any subject retreating shall not be engaged.

Discontinue all ADS use if a cease-fire is called by **anyone**.

Subject

Symptoms to watch for if exposed:

Blisters

Discomfort that persists beyond a few minutes and is distracting

The sensation that there is something in your eye