**Active Denial System**

**Enabling Technologies**

- First counter-personnel, non-lethal Directed Energy Weapon (DEW)
- First extended range DEW
- Highest energy shot for DEW
- Safest counter-personnel, non-lethal weapon with rapid, robust capability

**System Power Flow**

- Diesel Engine
- High Voltage Power Conditioning
- Gyrotron
- Directed Energy Beam
- Heat

**Active Denial System Incorporates Many Levels of Control to Ensure Safe, Effective Repel**

- **Hardware:** Boresighted sensor suite – operator sees entire beam path and target area – no ballistics or windage
- **Computer:** Limits shot duration and beam power to achieve a safe, effective, non-lethal repel effect
- **Operator:** Trigger is fail-safe: operator releases trigger to end shot
- **Target:** Repel effect forces target to move before getting injured

**ADS builds on groundbreaking technology to give our warfighters a major non-lethal capability**
Active Denial System Research and Health Effects Studies Began in 1993

Skin Research
- Energy penetrates ~ 1/64th inch or equal to three sheets of paper
- Energy beam heats surface of skin
- This produces a TEMPORARY heating sensation
- Subjects instinctively move to avoid the beam
- Aversion response = Self-limiting exposure

Eye Research
- Blink reflex occurs in ¼ second
- ADS beam does not penetrate through the eyelid
- Extensive research has been conducted
- Eye blink, head turn, and aversion response all protect eyes

Additional Research
- ADS exposure does not affect reproductive organs
- ADS does not initiate, promote, or co-promote skin cancer

A significant margin of safety exists between repel response and potential injury from ADS exposure
The safety and effectiveness of ADS is supported by more than a decade of scientific research.

**Testing**
- All exposures were done under formal human use protocols and the oversight of the USAF Surgeon General's Office.
- The test program was conducted in strict compliance with the procedures, laws, and federal regulations governing animal and human research.
- All testing, protocols, and results were reviewed by independent panels comprised of recognized academic and medical experts.
- Bio-effects research has undergone six independent reviews.

11,000+ human exposures conducted.
No adverse health effects.

There are no known long-term effects from ADS exposure.

The safety and effectiveness of ADS is supported by more than a decade of scientific research.
Legal and Treaty Review
The Active Denial System is Legal and Treaty Compliant

Legal Review
• ADS is a legal weapon
• Office of the Secretary of Defense, Joint Staff, and services legal counsel concur in analysis
• Signed by the Air Force Judge Advocate General (JAG) (System 1 - April 04, System 2 – Mar 08)

Active Denial System complies with International Laws of Armed Conflict.

Treaty Compliance Review
• Signed by the Under Secretary of Defense for Acquisition, Technology, and Logistics (System 1 - May 04, System 2 – May 08)

• ADS meets all treaty requirements
• U.S. Central Command JAG concurred that ADS is employable under current Rules Of Engagement

ADS will provide our warfighters additional options on today’s complex battlefields
**Active Denial System Assessment Events**

**ADS has undergone rigorous assessments to determine operational deployment suitability**

<table>
<thead>
<tr>
<th>Extended User Evaluation</th>
<th>Capabilities and Limitations Assessment</th>
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<tbody>
<tr>
<td><strong>Oct 06 – Sep 07</strong></td>
<td><strong>Jan 08 – Apr 08</strong></td>
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<td>The EUE was conducted by the 820th Security Forces Squadron at Moody AFB, Georgia, using the System 1 technology demonstrator. Multiple scenarios and situations were evaluated. The ADS was exercised twice weekly; almost 1600 shots were fired. The capability of ADS to move, suppress, or deny personnel access to an area was well documented.</td>
<td>The purpose of the CLA was to determine the suitability and supportability for fielding System 2 in an operational theater. The ADS was extensively exercised in multiple scenarios and environments, including 91 hours with approximately 1400 shots fired. Obtained meaningful suitability data (maintainability, deployability, training)</td>
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**Results**

ADS permits early and long-range engagements to disrupt or disperse as needed. The ADS also provided a means to disrupt “suspicious” persons long enough to permit a quick reaction force to intercept

**Results**

ADS provides a non-lethal alternative to the warfighter that is suitable and supportable for deployment in a wide range of operating temperatures

**ADS “System 2” is assessed to be fully supportable in theater**
Non-lethal weapons continue to evolve in response to the needs of our warfighters

**ADS Transition to Warfighter**

Assure Warfighter needs addressed and fulfilled

- Assist approval process for joint requirements documents
- Capture lessons learned from MUAs, EUE, and ops concepts

Expedite transition of ADS capability to Warfighter

- Advance technologies -- smaller, lighter, more capable, ease of use
- Ensure systems are effective, producible, sustainable
- Coordinate Service developments, collaborate w/ other Gov’t agencies
- Facilitate potential joint/Service ADS acquisitions
- Assure joint and Service-specific employment options maintained
- Maritime, Ground, Airborne

*Non-lethal weapons continue to evolve in response to the needs of our warfighters*
Active Denial System
Bridge Program (FY08 – FY09)

Directed energy technology will expand the utility of non-lethal weapons

ADS represents a breakthrough non-lethal capability for the warfighter