

SARA, Inc.
15261 Connector Lane
Huntington Beach, Ca 92649-1117
(714) 903-1000



**Scientific Applications
& Research Associates**

MSDD (Multi-Sensory Distraction Device)



Joint N LW D



USMC Warfighting Lab



USAF Reas Labs



DTRA

SARA, Inc.
(714) 903-1000

Overview

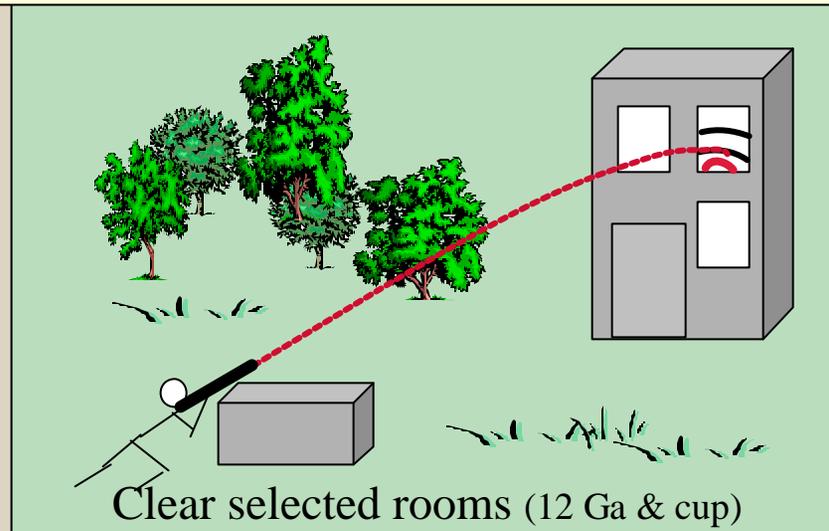
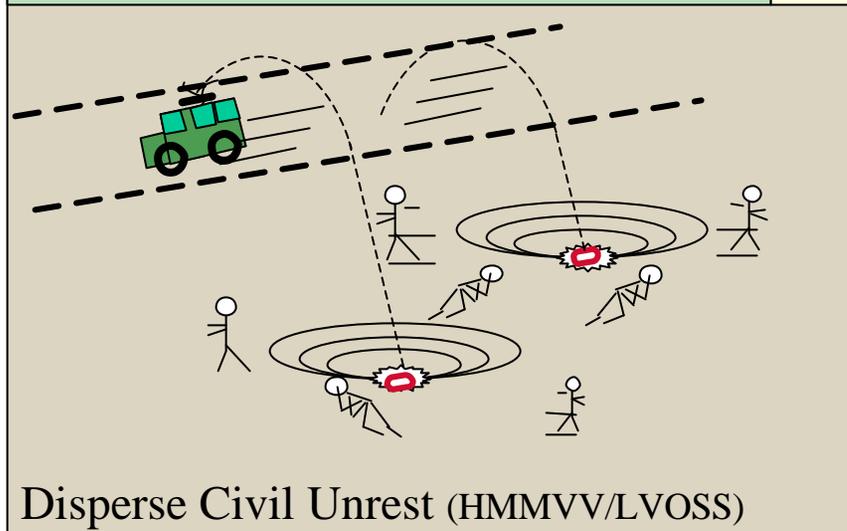
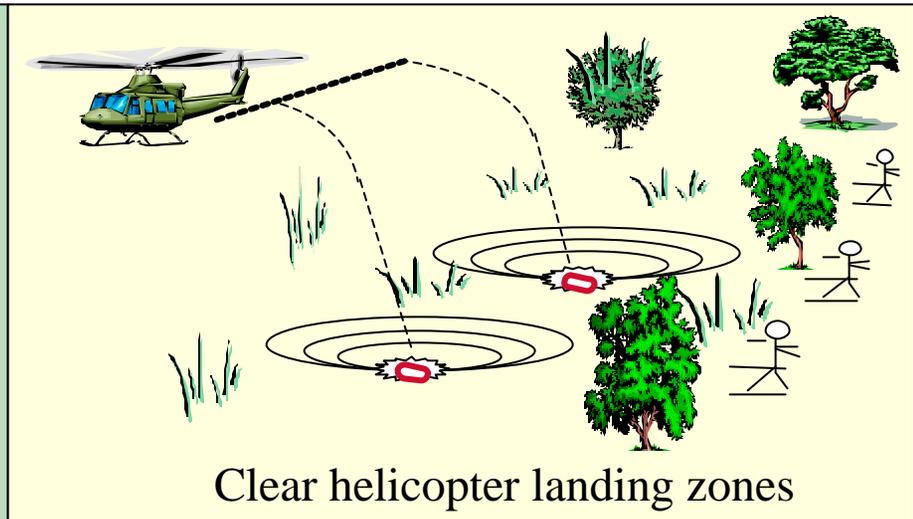
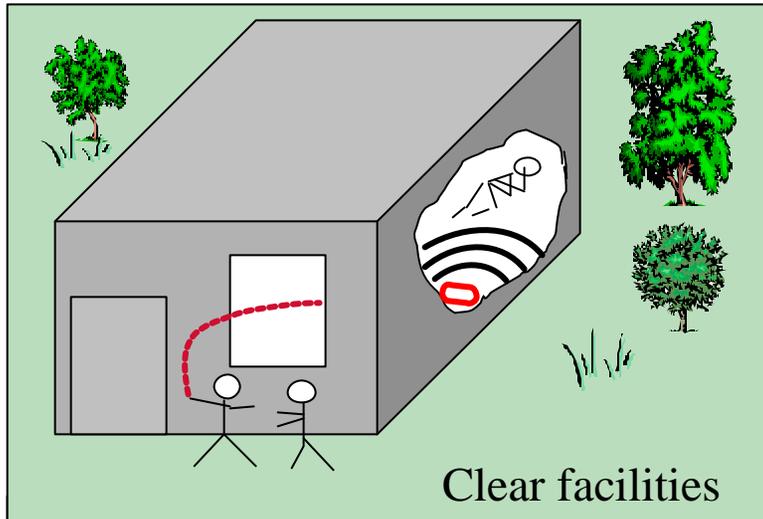


-
- JNLWD is supporting USMC SBIR Phase I study of a “Multi-Sensory Distraction Device” primarily in support of the JNLWD core capability for the “clear facilities” mission.
 - The MSDD is a device that puts out distracting levels of light, acoustic energy and a malodorant
 - Non-lethal considerations will be discussed, but proof lies ahead . . . NOTE: No human or animal effects testing has been conducted in association with this JNLWD effort
 - Current “Phase I” component demo contract anticipates a “Phase II” device demonstration

Frustrated forces use “anything they can pick up” when they get mad



Disrupt without damage: SARA's concepts for MSDD application



MSDD Concept



- Clear facilities by multi-sensory overwhelm through combined effects *at levels below the damage onset* threshold of each component
 - Intense audible sound
 - Intense visible light
 - Intense repugnant smell (malodorant)
- Combined effects: *more than the sum of the parts!*
- Man-tossable and/or stand-off deliverable using mechanical emplacement systems
- Objective: soda-can sized device

MSDD leverages the Acoustic DD concept developed for DTRA



3 Levels of Sensory Disrupt:



DTRA

•Intense Audible Acoustics

- Defeat Verbal Comms, Startle



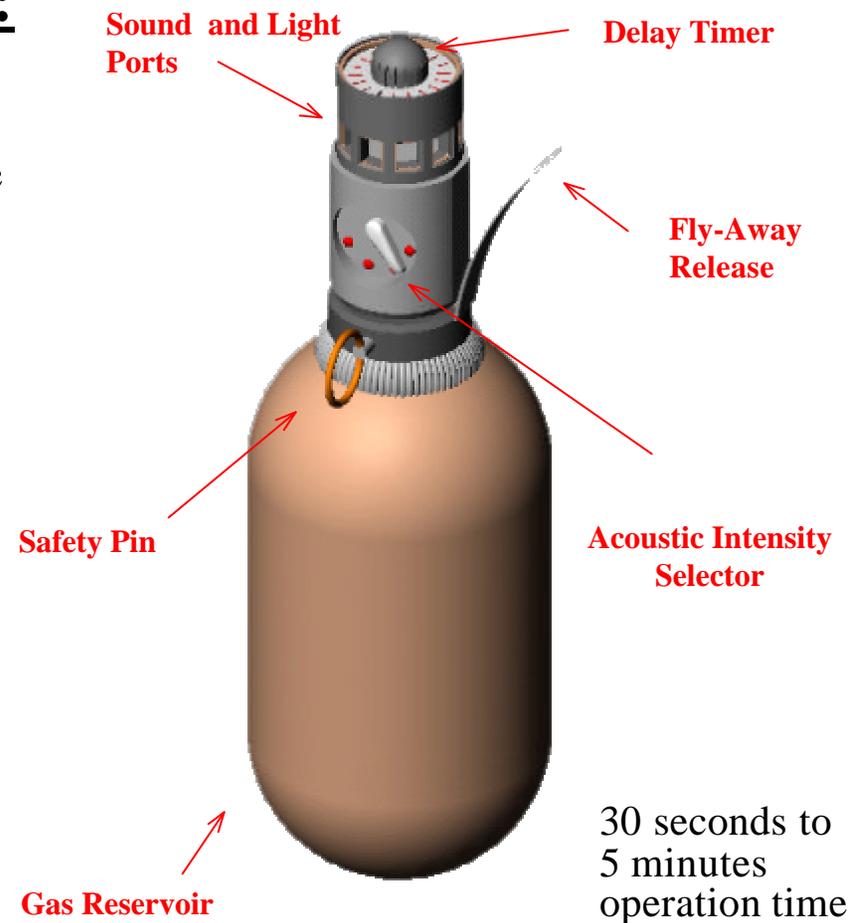
•Intense Light

- Distract, Disrupt line of sight

•Malodorant

- Distract, Disgust, Deny

Size will depend on operation duration: 12 oz soda can to 2-liter soda bottle

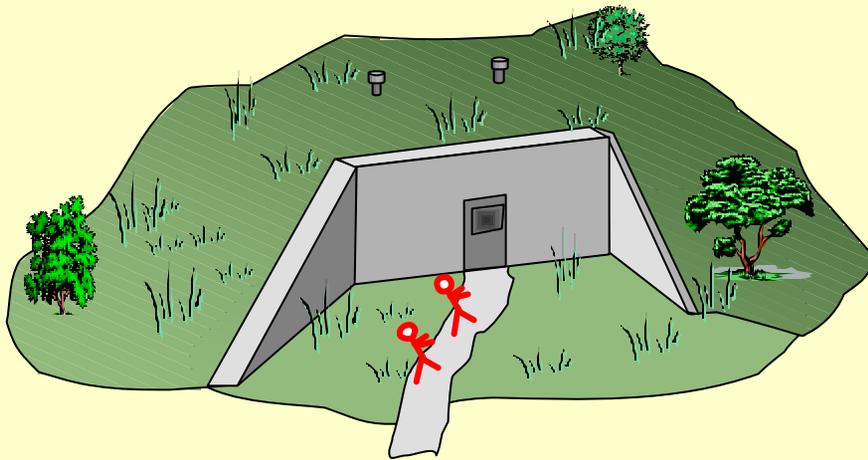


Our units can operate freely while the enemy is distracted/degraded

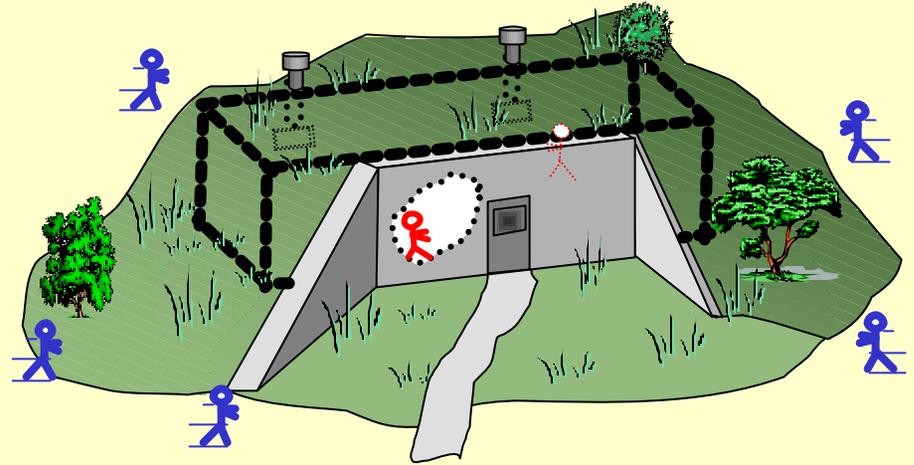


- Friendly units get at least a 30 second tactical advantage
- Sustained operation yields initial “startle” - type effects plus sustained operation to encumber the enemy
 - Sustained Audible Sound
 - > Hearing attenuators (ear plugs) will allow friendly operation while the enemy is covering their ears
 - Sustained Intense light
 - > Band-pass or ND filters (special goggles) will allow friendly operation while the enemy is covering their eyes
 - Sustained Malodorant
 - > Counter-agent or respirator will allow friendly operation while the enemy is holding their nose

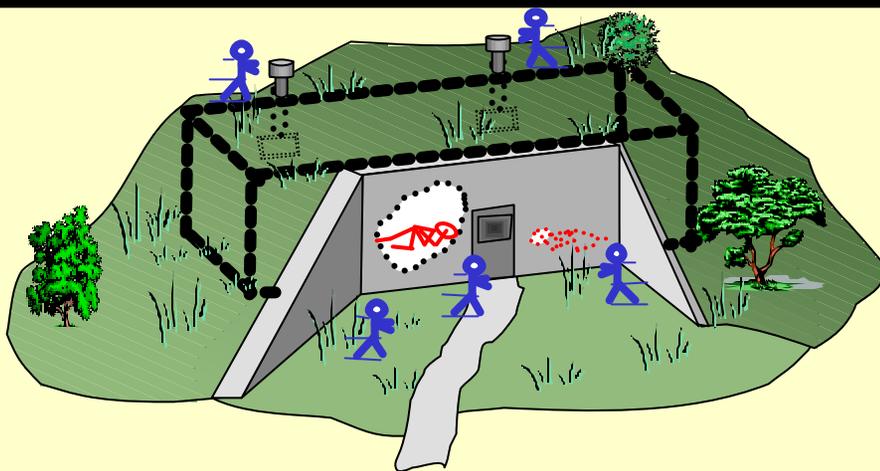
MSDD reintroduces “Protected Friendlies” NLW CONOPS



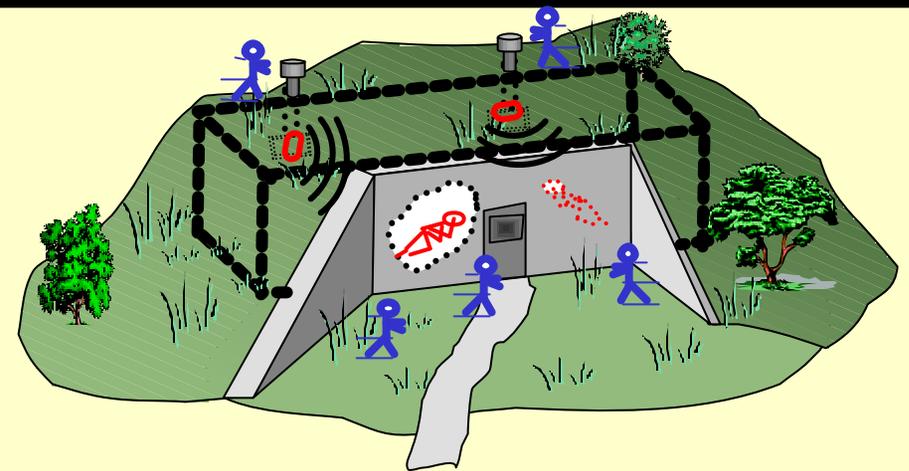
Enemy invades facility



Friendly unit secures perimeter



(Old NLW) unprotected unit rushes facility *after* disruption/disablement



(New NLW) protected unit rushes facility *during* disruption

Development of MSDD Components



- Acoustic Generator: SARA proprietary “SWO” compact acoustic source technology already exceeds MSG requirements
 - SWO already demonstrated under contract to DTRA
 - Device miniaturization path already demonstrated under contract to USAF
- High Power Lamp: SARA is leveraging it’s chemical laser expertise to advance university-identified lamp physics
- Malodorant: A variety of malodorants have been developed and are commercially available. SARA plans on integrating commercial maloderant into the Phase II prototype



Acoustic Generator Development

Defeat Verbal Comms & Startle

Intense Acoustics yields selectable effects



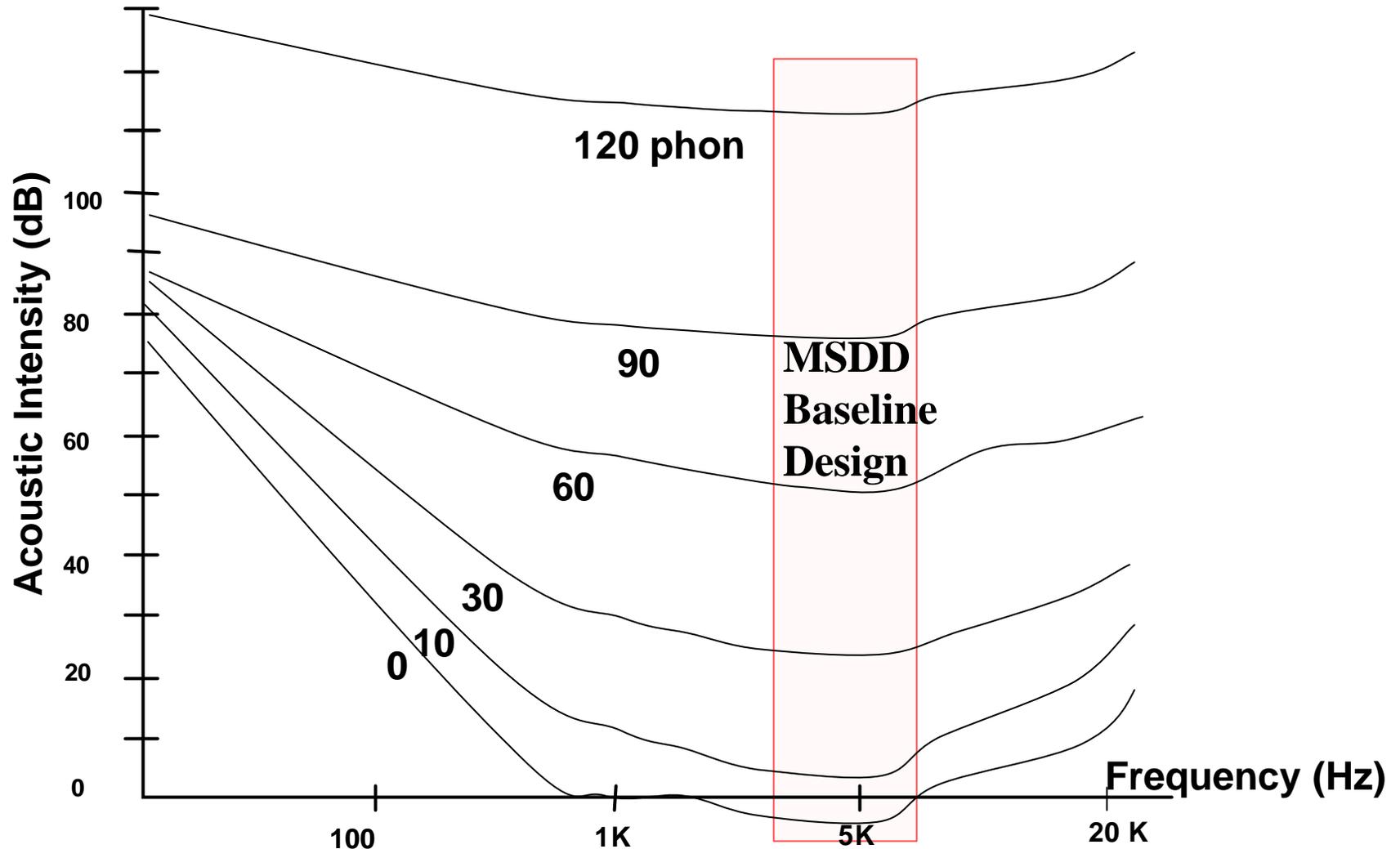
The use of intense sound can provide “Operator-selectable” levels of force

- Warning
- Distraction or Verbal Comms Disruption
- Likely pain - auditory and/or other
- Likely physical damage
- Beyond

MSDD intensity limit

NOTE: No human or animal effects testing was conducted on this JNLWD effort

Equal loudness curves suggest auditory target frequency (Fletcher-Munson equal loudness curves)



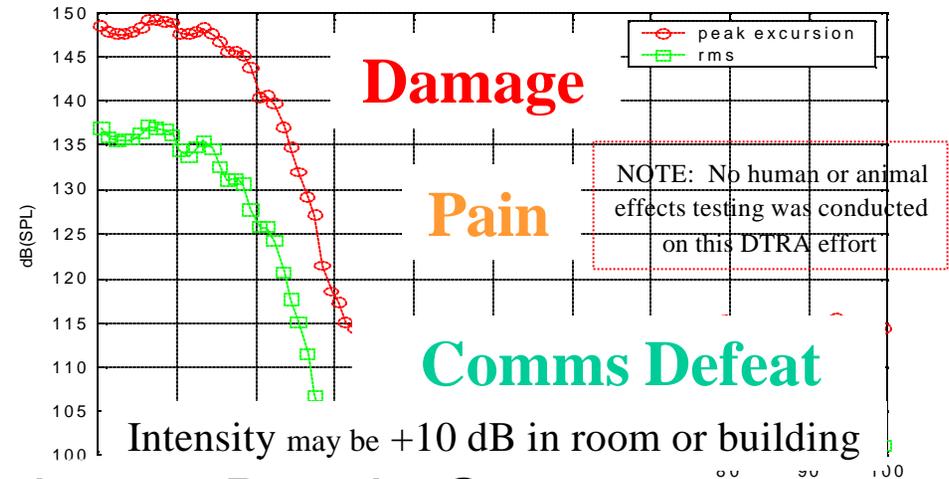
NOTE: No human or animal effects testing was conducted on this JNLWD effort



DTRA



Compact acoustic device testing (under prior contract)



Lab test in Huntington Beach, Ca.



Field Test in Bunker at Ft. Belvoir, Va.



High Power Lamp Development

Distract, Disrupt line of sight

Intense light yields various effects



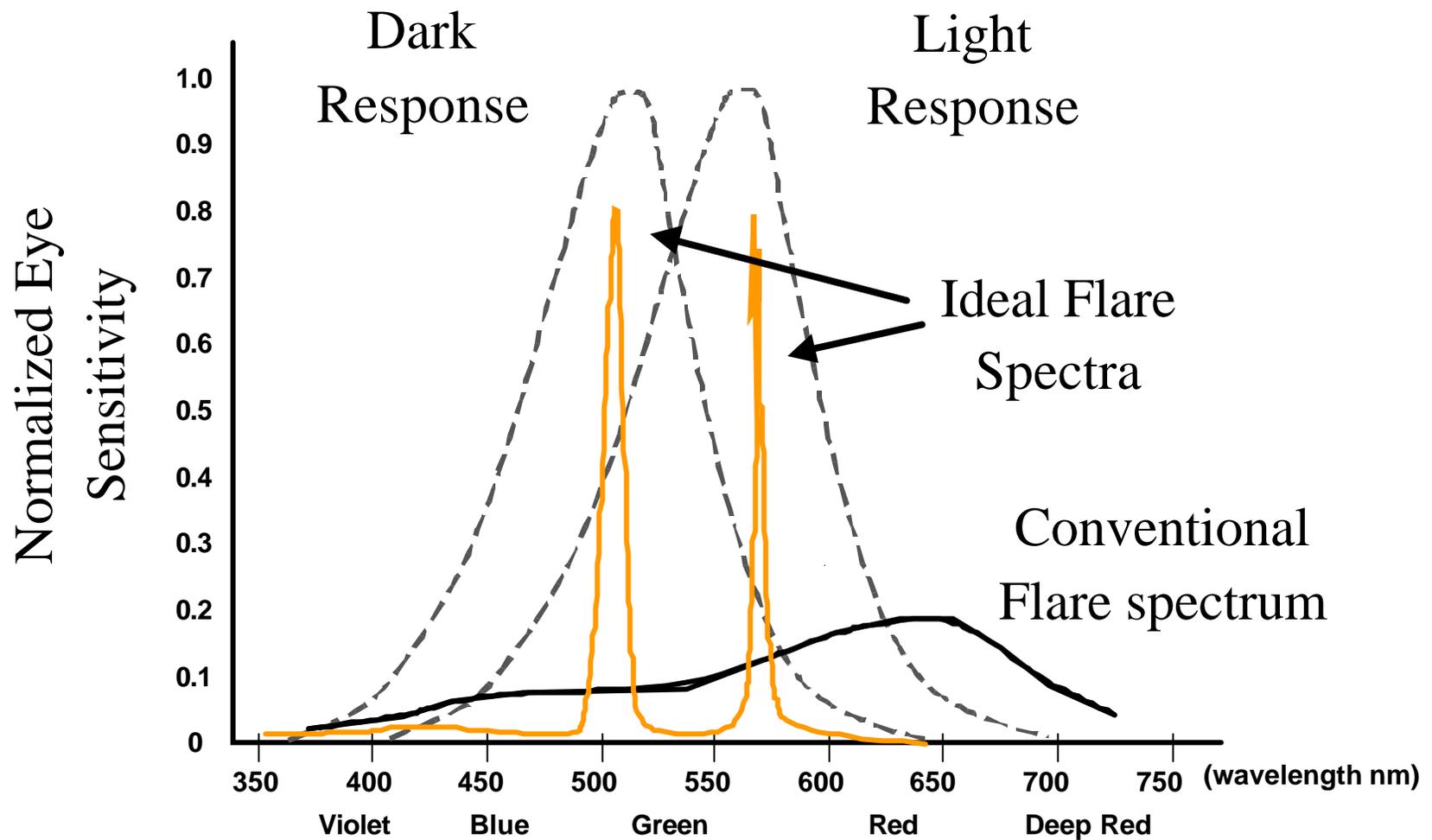
The use of intense light can provide various levels of effect

- Warning
- Distract/Annoy
- Must look away/around (Flood light)
- Temporary residual blindness (Flash bulb)
- Beyond

MSDD intensity limit

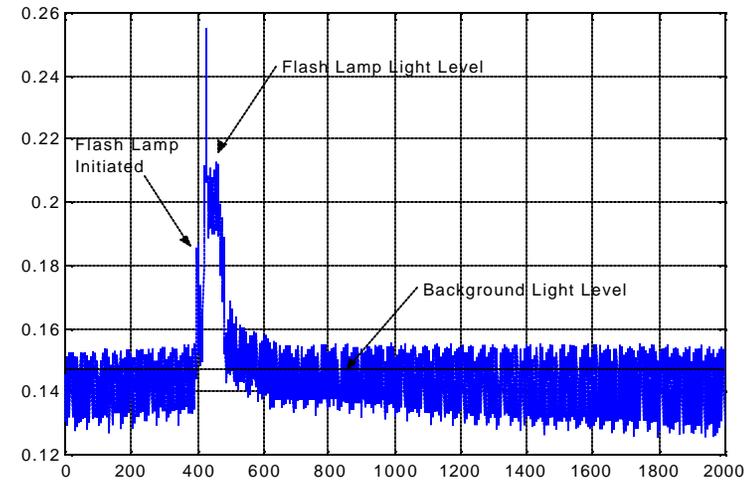
NOTE: No human or animal effects testing was conducted on this JNLWD effort

Human Eye peak responses suggest optical target frequencies



NOTE: No human or animal effects testing was conducted on this JNLWD effort

High Power Lamp is being demonstrated under this Phase I contract



Lab test in Huntington Beach, Ca.



Malodorant Concept

Distract, Disrupt line of sight

Intense odors may be repugnant



The use of intense odor can provide various levels of effect

- Warn
- Annoy
- Disgust/Drive away
- Nauseate/Wretch
- ?

..... No maximum level has yet been established for MSDD odor
But an on/off switch is being investigated

NOTE: No human or animal effects testing was conducted on this JNLWD effort

Several Malodorants exist



A number of Malodorants exist:

- DeNovo makes “Dragonbreath”, others are in development

Typical interested/involved agencies/users include:

- LA Sheriffs
- US Army
- US Marine Corps

These are concentrates of natural odors such as :

- Rotting meat
- Feces
- Skunk
- B. O.

These could be included in the acoustic “fuel”, today

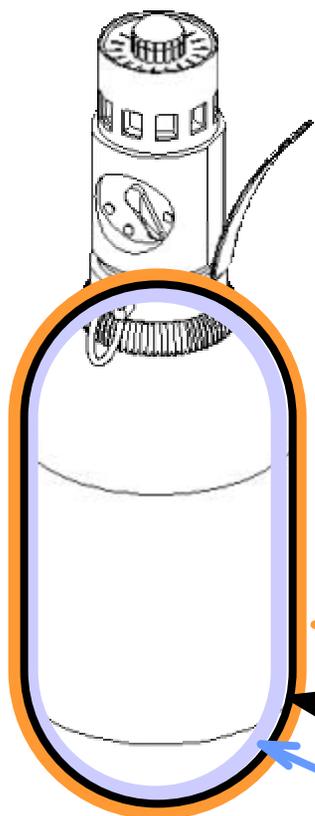


Productization

Affordable and fieldable packaging techniques have been identified



Tactical bottle will use standard, DOT approved, (and droppable) technology



- Firefighter Respirator-type Construction

- DOT approved; “CFFC”

- good to 5000psi (3.4 safety factor)
technology also good to 10,000 psi, but not certified

Fiber Glass (protection)

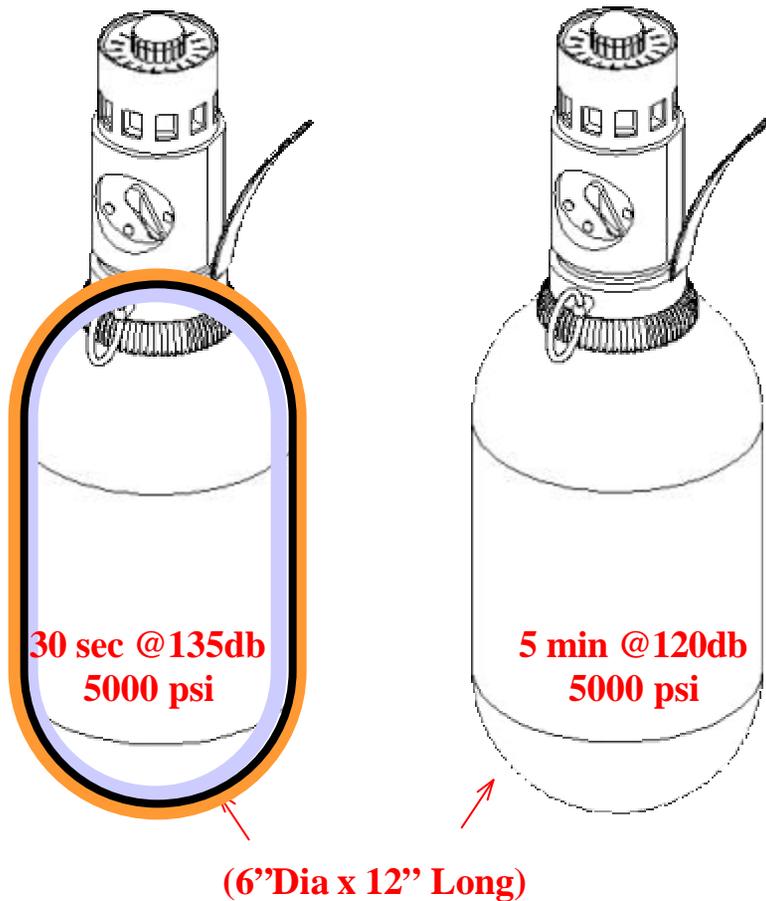
“low strength” Carbon Fiber (structural strength)

6061 Aluminum Alloy (seal & shape)

Intensity and operating time will drive size



2-liter bottle size



Tennis ball can

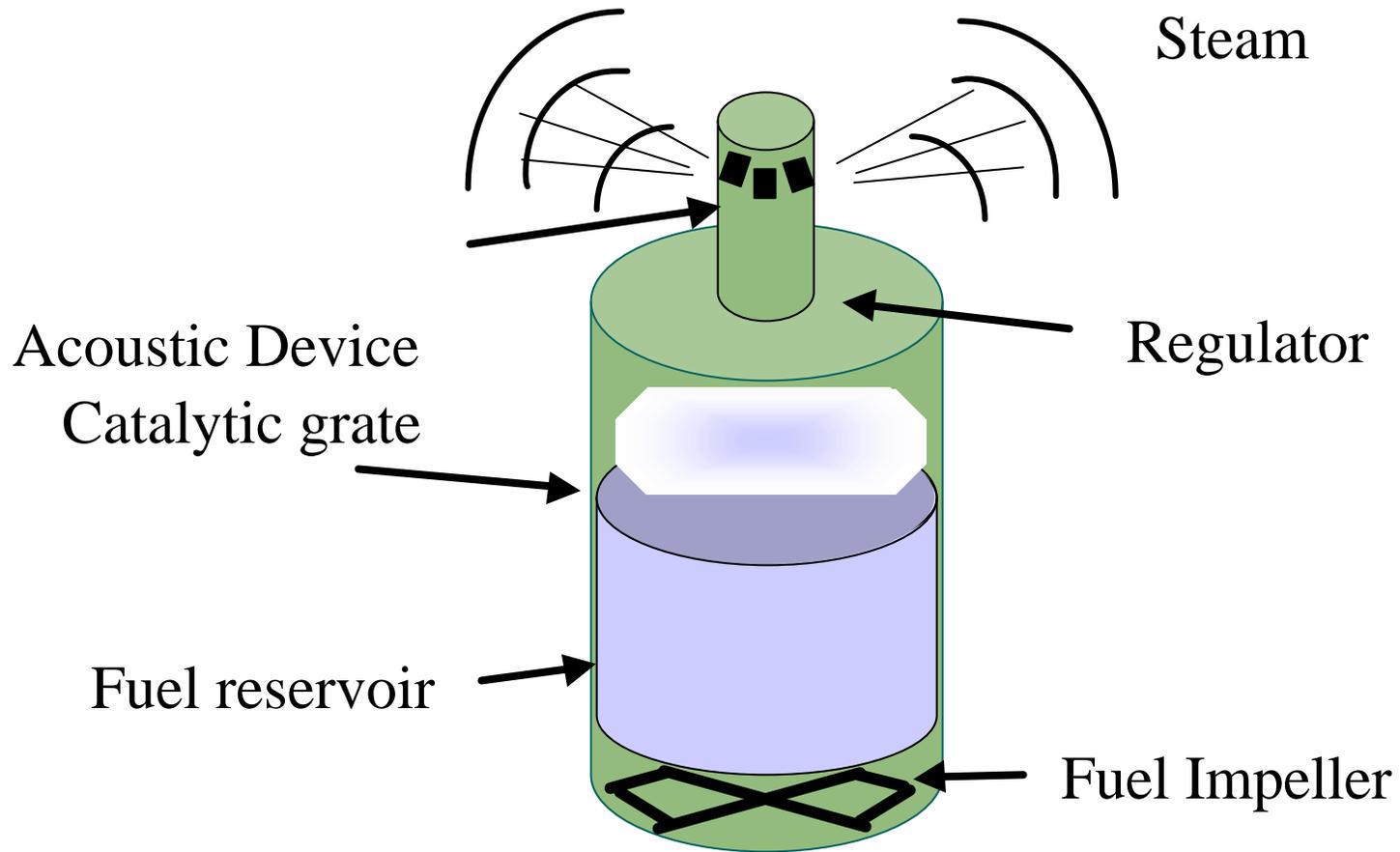


12oz Soda can





USAF/SARA research has demonstrated additional size reduction



Looking for all the help we can get



- SARA is working with civilian law enforcement for multi-sensory experience and requirements
 - NIJ - National Law Enforcement Corrections Technology Center (NLECTC), West
 - Los Angeles County Sheriffs Dept
 - LAS Terrorism Early Warning Working Group
 - Sybil Brand Institute for Women, LA Calif.
 - Orange County Sheriffs Dept
 - Musick County Prison, Irvine California
 - Federal Men's Prison, Chino California

MSDD Development Path



Phase I: Demonstrate Core Technologies



**Acoustics:
in Hand**

**Malodorant:
Off the Shelf**

**Flash Lamp:
in test**



NOW

Phase II: -Technology Packaging -Prototype Development

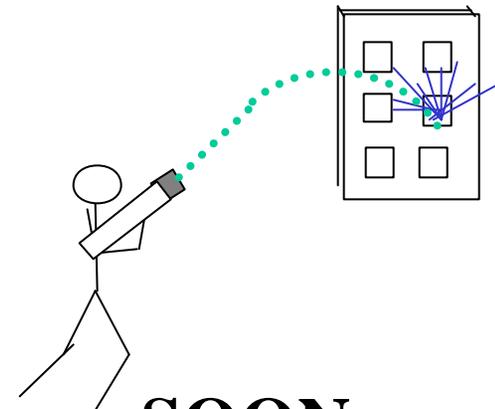
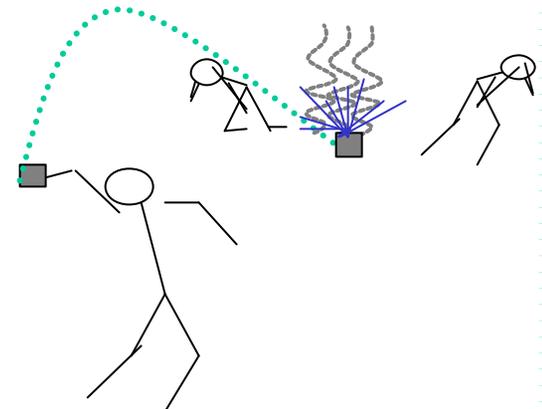


**Sound and
Light Ports**

**Gas Reservoir
with Malodorant**

Starts this year

Phase III: -Productization -Advanced Delivery



SOON

Summary



-
- The technology for a Multi-Sensory Distraction Device is being demonstrated at the component level, today
 - Simultaneous assault on 3 senses (Sight, Hearing & Smell/Taste) will disorient unprepared adversaries and disadvantage even prepared adversaries
 - Our prepared attack force will have a distinct tactical advantage: surprise, sight & overwhelming distraction
 - Steps for further development are planned and are expected to proceed, given Phase I success

NOTE: No human or animal effects testing was conducted on this JNLWD effort